

A MESSAGE AND PROGRAM SYSTEM SUPPORTING COMMUNICATION

TECHNICAL FIELD

This invention relates to a messaging communication method and program system supporting communication between patients and physicians, physician extenders including nurses, and the ordering of prescriptions, alternatively supporting communication between clients, service providers, service extenders including service assistants and the ordering of services.

DESCRIPTION OF THE PRIOR ART

10 Figure 1 depicts prior art human-computer interfaces capable of supporting messaging upon communications networks. One exemplary prior art computer system includes a display screen 2 in an enclosure 4, audio speakers 6 and 8, a second enclosure 10 housing a removable media drive 12. Keyboard 14 is interfaced via physical transport mechanism 16 to the computer. Selector device 18 is interfaced via physical transport mechanism 20 to the computer. Audio microphone 22 is interfaced via physical transport mechanism 24 to the computer. The computer system interfaces via physical transport mechanism 30 to network 32.

Certain exemplary prior art handheld computer interfaces are often single
20 enclosures 40 incorporating a miniature display screen 42 with buttons 44 and a pointing device 46. The computer enclosure 40 is often held in one hand, while the pointing device 46 is held with the other hand. Wireless communications port 48 can both transmit 50 signals and receive 38 signals

transmitted by wireless transceiver interface **36**, which interfaces to network **32** via physical transport mechanism **34**. Other exemplary uses of such devices include mounting enclosure **40** on a wrist- or arm-band, thus freeing one hand.

- 5 Other exemplary prior art computer systems include but are not limited to devices incorporating one or more audio speakers such as **6** or **8**, at least one audio microphone **22**, which may or may not possess a display screen **2**, but often possess a miniature display screen **42** and often several buttons **44** or keyboard **14**. Cellular telephones, both hand held and vehicle-mounted,
- 10 possessing all these features are readily available connecting to either local wireless networks or larger national and international networks, in some cases through orbiting satellite transceivers **36**, which use separate carriers **34** to further interface to ground base stations which provide high bandwidth gateways to large Wide Area Networks (WANs), including the Internet and the
- 15 World Wide Web.

These exemplary devices are often capable of receiving messages, such as e-mail and paging messages. Many of these exemplary devices are capable of audio exchanges in a fashion similar to a telephone with a telephone messaging center. Many of these exemplary devices may further support the

- 20 loading and adding of programs to provide upgraded services and new service capabilities. Many of these systems possess the ability to retain such loaded or added programs after the power to the module has been turned off.

Such devices have been used to further provide a communication avenue between patients and physicians, through email and paging-style messages.

- 25 Paging a doctor with a short message such as "Water has broken" may give

an adequate portrayal of some situations such as the imminence of labor in childbirth. However, such a messaging system could not adequately portray the circumstances regarding a potential breach birth.

Traditional telephones have often been used to permit a physician and patient 5 to communicate. However, there are problems with such devices. Telephones without answering or message centers require that both patient and physician be available at essentially the same time, which is often difficult to arrange. Telephones, even with messaging centers, still have problems. Often the stored messages are short in duration. Even when the messages 10 may be quite long, patients do not tend to give concise, clear and complete verbal medical descriptions of exactly the relevant conditions needed to describe their medical condition. This leads to a situation of question and answers, often with the patient and/or doctor having to wait significant amounts of time between each "bounce" before there is enough information in 15 front of the physician to respond with a consultation. Further, physicians must listen through their patients messages, often wasting time trying to sort through the words to determine the observed medical conditions. This is an inefficient use of the physicians' time.

Email exchanges between patients and physicians can provide greater 20 amounts of information. However, there is a tendency to waste both patient and doctor time for several reasons. First, patients do not tend to write concise, clear and complete medical descriptions of exactly the relevant conditions needed to describe their medical condition. This is understandable, most people are not trained enough at medicine to know 25 what a physician will need to know. This again leads to question and answer

situations, often with the patient and doctor having to wait significant amounts of time between each “bounce” before there is enough information in front of the physician to respond with a consultation. Further, physicians must read what their patients have written, often wasting time trying to sort through the words to determine the observed medical conditions. This is an inefficient use of the physicians’ time.

The devices mentioned above have also been used to further provide a communication avenue between clients and service providers for various kinds of service support, through email and paging-style messages. Brief messages such as “flat tire” may convey adequate information in some circumstances but would be fundamentally inadequate in situations based around mission critical technologies such as aircraft.

Consider a commonly occurring scenario in the airline industry. A technician in an isolated location finds an intermittent failure in testing a system possessing electromechanical, fluidic and airfoil control components, by way of example. The determination of the proper course of action involves decisions regarding each of these areas of the aircraft’s technologists, combined with an understanding of the reliability history of the system involved and the relevant government and airline regulations. Client such as the local airport technician need access to high level, integrated service provider responses.

Traditional telephones have often been used to permit a service provider and client to communicate. However, there are problems with such devices. Telephones without answering or message centers require that both client and service provider be available at essentially the same time, which is often

difficult to arrange or involve the clients waiting for extended periods of time “on hold”. Telephones, even with messaging centers, still have problems. Often the stored messages are short in duration. Even when the messages may be quite long, clients do not tend to give concise, clear and complete

5 verbal service descriptions of exactly the relevant conditions needed to describe their service condition. This leads to a situation of question and answers, often with the client and/or doctor having to wait significant amounts of time between each “bounce” before there is enough information in front of the service provider to respond with a consultation. Also, the expertise of the

10 service providers may vary greatly, making the omission of specific questions possible, limiting the utility of the direct contact. Further, service providers must listen through their clients messages, often wasting time trying to sort through the words to determine the observed service conditions. This is an inefficient use of the service providers’ time.

15 Email exchanges between clients and service providers can provide greater amounts of information. However, there is a tendency to waste both client and doctor time for several reasons. First, clients do not tend to write concise, clear and complete service descriptions of exactly the relevant conditions needed to describe their service condition. This is understandable, most

20 people are not trained enough in the service area’s technology to know what a service provider will need to know. This again leads to question and answer situations, often with the client and doctor having to wait significant amounts of time between each “bounce” before there is enough information in front of the service provider to respond with a consultation. Further, service providers

25 must read what their clients have written, often wasting time trying to sort

through the words to determine the observed service conditions. This is an inefficient use of the service providers' time.

Figure 2 depicts a generic prior art block of a messaging communications system supporting the online ordering of prescriptions by physicians interacting with pharmacies. Email and other messaging systems have been used to provide a limited form of automation for the placing of prescription orders with various pharmacies possessing online message capabilities.

Physician 100 interacts 102 with a physician-operated computer 104, which may be a desktop, notebook, or handheld computer, possibly embedded in a cellular telephone. The physician operated computer 104 sends a specialized message, a prescription ordering message, using physical transport mechanism 106 to a network 108, which is controlled and accessed 110 by network server 112. Network server 112 accesses 114 medical databases and patient database 116. Network server 112 then sends a specialized pharmaceutical order message to a pharmacy computer 120 which is linked 118 to the same network 110.

There is a central problem with such systems. The patient is not part of the interaction. The patient cannot choose whether to order the prescription. The patient cannot choose which pharmacy or where the pharmacy sends the prescription, or whether a traditional brick and mortar pharmacy is preferred.

The patient cannot choose between different brands.

Summary of the Invention

One aspect of this invention embodies a method of messaging upon a network involving at least one physician, at least one patient and a workflow engine. Each physician operates a computer, which from time to time is capable of receiving and sending messages upon the network at a corresponding address on the network. Each patient operates a computer, which from time to time, is capable of receiving and sending messages upon the network at a corresponding address on the network. The workflow engine accesses the network for receiving and sending messages upon the network using at least one workflow engine address on the network. The method comprises using a first medical message wizard by the patient on the patient operated computer, a medical profiler process performed by the workflow engine and a second medical message wizard by the first physician on the physician operated computer at the first corresponding physician address.

Using the first medical message wizard by the patient is further comprised of generating an educated query message and sending the educated query message to the medical profiler address. Performing the medical profiler process by the workflow engine is further comprised of receiving the educated query message at the medical profiler address; processing the received educated query message; generating a patient message log entry in a medical profile of the patient; generating a patient medical query message; sending the patient medical query message to a first physician with the corresponding physician address. Using the second medical message wizard by the first physician is further comprised of receiving the patient medical query message; processing the patient medical query message; generating a

physician-viewable patient medical query message; and displaying a physician-viewable patient medical query message.

This embodiment of the invention has several advantageous characteristics: It minimizes the need for extensive typing for the patient. It decreases the need

5 for message “ping-pong” between patient and physician due to insufficient information in the patient’s messages to the physician. It allows the physician to read in an optimized format, which minimizes the physician’s reading time.

In many cases, the physician will not need to poll a chart pool, because the medical profile will cover the required information. There is no need for phone

10 tag with patients.

A further aspect of this invention involves further embodiments of the first messaging wizard, medical profiler process and second messaging wizard.

The second medical message wizard further comprises responding to the

15 physician-viewable patient medical query message; generating a patient response message; sending the patient response message; and copying the patient response message with an appended physician billing data to the workflow engine. Responding to the physician-viewable patient medical query message creates a first-physician response. Generating a patient response message from the physician-viewable patient medical query message and the first-physician response. Sending the patient response message to the patient at the corresponding patient address.

The medical profiler process further comprises: receiving the copied patient response message with the appended physician billing data; processing the

25 received, copied patient response message with the appended physician

billing data; generating a patient response log entry in the medical profile of the patient. Processing the received, copied patient response message with the appended physician billing data creates a processed, received, copied patient response message with the appended physician billing data. The
5 generating a patient response log entry in the medical profile of the patient is from the processed, received, copied patient response message with the appended physician billing data.

The first message wizard further comprises: receiving the patient response message; processing the received patient response message to create a
10 processed, received patient response message; and displaying the processed, received patient response message.

This aspect of the invention is advantageous for several reasons. It supports the physician responding to the optimized educated query of the patient. It supports the automated logging of physician responses with billing information
15 at the workflow engine. It supports the patient receiving the physician's response.

Further embodiments of this invention advantageously support the use of authentication keys insuring secure communications between patient and workflow engine, between patient and physician and between physician and
20 workflow engine.

Further embodiments of this invention advantageously support physician extenders, including nurses, physician assistants and administrators.

Further embodiments of this invention advantageously support prescriptions involving, not only the physician, workflow engine and pharmacy, but also the

patient. This is advantageous for several reasons. The patient takes part in the prescription-ordering interaction. The patient can choose whether to order the prescription. The patient can choose which pharmacy to purchase the prescription from. The patient can choose where the pharmacy sends the prescription. The patient can choose whether a traditional brick and mortar pharmacy is preferred. The patient can choose between different brands.

Another aspect of this invention embodies a computer program residing on a computer readable medium accessible by the patient operated computer capable of receiving patient response messages and sending messages to a workflow engine. It includes code for receiving the patient response message with an embedded prescription; code for displaying the received patient response message; code for responding to the patient response message; code for sending the patient prescription message to the workflow engine. The code for responding to the patient response message further includes code for generating a patient prescription message from the embedded prescription.

This aspect of the invention is advantageous for several reasons. The patient takes part in the prescription-ordering interaction. The patient can choose whether to order the prescription. The patient can choose which pharmacy to purchase the prescription from. The patient can choose where the pharmacy sends the prescription. The patient can choose whether a traditional brick and mortar pharmacy is preferred. The patient can choose between different brands.

Another aspect of this invention embodies a method of messaging upon a network involving at least one service provider, at least one client and a

service-flow engine. Each service provider operates a computer, which from time to time is capable of receiving and sending messages upon the network at a corresponding address on the network. Each client operates a computer, which from time to time, is capable of receiving and sending messages upon the network at a corresponding address on the network. The service-flow engine accesses the network for receiving and sending messages upon the network using at least one service-flow engine address on the network. The method comprises using a first service message interface by the client on the client operated computer, a service profiler process performed by the service-flow engine and a second service message interface by the first service provider on the service provider operated computer at the first corresponding service provider address.

Using the first service message interface by the client is further comprised of generating an educated query message and sending the educated query message to the service profiler address. Performing the service profiler process by the service-flow engine is further comprised of receiving the educated query message at the service profiler address; processing the received educated query message; generating a client message log entry in a service profile of the client; generating a client service query message; sending the client service query message to a first service provider with the corresponding service provider address. Using the second service message interface by the first service provider is further comprised of receiving the client service query message; processing the client service query message; generating a service provider-viewable client service query message; and displaying a service provider-viewable client service query message.

This embodiment of the invention has several advantageous characteristics: It minimizes the need for extensive typing for the client. It decreases the need for message “ping-pong” between client and service provider due to insufficient information in the client’s messages to the service provider. It 5 allows the service provider to read in an optimized format, which minimizes the service provider’s reading time. In many cases, the service provider will not need to poll a chart pool, because the service profile will cover the required information. There is no need for phone tag with clients.

A further aspect of this invention involves further embodiments of the first

10 message interface, service profiler process and second message interface.

The second service message interface further comprising responding to the service provider-viewable client service query message; generating a client response message; sending the client response message; and copying the client response message with an appended service provider billing data to the 15 service-flow engine. Responding to the service provider-viewable client service query message creates a first-service provider response. Generating a client response message from the service provider-viewable client service query message and the first-service provider response. Sending the client response message to the client at the corresponding client address.

20 The service profiler process further comprises: receiving the copied client response message with the appended service provider billing data;

processing the received, copied client response message with the appended service provider billing data; generating a client response log entry in the service profile of the client. Processing the received, copied client response 25 message with the appended service provider billing data creates a processed,

received, copied client response message with the appended service provider billing data. The generating a client response log entry in the service profile of the client is from the processed, received, copied client response message with the appended service provider billing data.

- 5 The first message interface further comprises: receiving the client response message; processing the received client response message to create a processed, received client response message; and displaying the processed, received client response message.

This aspect of the invention is advantageous for several reasons. It supports
10 the service provider responding to the optimized educated query of the client. It supports the automated logging of service provider responses with billing information at the service-flow engine. It supports the client receiving the service provider's response.

Further embodiments of this invention advantageously support the use of
15 authentication keys insuring secure communications between client and service-flow engine, between client and service provider and between service provider and service-flow engine.

Further embodiments of this invention advantageously support service extenders, including service assistants, service provider assistants and
20 administrators.

Further embodiments of this invention advantageously supports service recommendations involving the service provider, service-flow engine and supplier, but also the client. This is advantageous for several reasons. The client takes part in the service recommendation-ordering interaction. The

client can choose whether to order the service recommendation. The client can choose which supplier to purchase the service recommendation from. The client can choose where the supplier sends the service recommendation. The client can choose whether a traditional brick and mortar supplier is preferred. The client can choose between different brands.

Another aspect of this invention embodies a computer program residing on a computer readable medium accessible by the client operated computer capable of receiving client response messages and sending messages to a service-flow engine. It includes code for receiving the client response message with an embedded service recommendation; code for displaying the received client response message; code for responding to the client response message; code for sending the client service recommendation message to the service-flow engine. The code for responding to the client response message further includes code for generating a client service recommendation message from the embedded service recommendation.

This aspect of the invention is advantageous for several reasons. The client takes part in the service recommendation-ordering interaction. The client can choose whether to order the recommended service(s). The client can choose which supplier to purchase the recommended service(s) from. The client can choose where the supplier delivers the recommended service(s). The client can choose whether a traditional brick and mortar supplier is preferred. The client can choose between different brands.

These and other advantages of the present invention will become apparent upon reading the following detailed descriptions and studying the various figures of the drawings.

Brief Description of the Drawings

Figure 1 depicts prior art human-computer interface capable of supporting messaging upon communications networks;

Figure 2 depicts a generic prior art block of a messaging communications system supporting the online ordering of prescriptions by physicians interacting with pharmacies;

Figure 3A depicts a flow diagram of an embodiment of the invention in accordance with certain embodiments;

Figure 3B depicts a more detailed flow diagram of an embodiment of the

invention in accordance with certain embodiments;

Figure 4 depicts an interactive flow between a patient using a first messaging wizard, medical profiler performing a medical profiler process and physician using a second messaging wizard in accordance with an embodiment of the invention;

Figure 5 depicts a flowchart of operations supporting the generation and sending of an educated query by a patient using the first messaging wizard in accordance with embodiments supporting Figure 4;

Figure 6 depicts a flowchart of operations supporting the reception, processing, logging of the educated query message from the patient, and the generation and sending of the patient medical query message to a physician by the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 4;

Figure 7 depicts a flowchart of operations supporting reception, processing and viewing the patient medical query message by the second message wizard for the physician in accordance with embodiments supporting Figure 4;

5 Figure 8 depicts a flowchart of operations supporting reception, generation and sending a patient response message, as well as copying the patient response message with an appended physician billing data to the medical profiler address in accordance with embodiments supporting Figure 4;

10 Figure 9 depicts a flowchart of operations supporting the reception, processing, logging the copied patient response message with an appended physician billing data by the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 4;

15 Figure 10 depicts a flowchart of operations supporting reception, processing and display of the patient response message using the first messaging wizard on the patient operated computer in accordance with embodiments supporting Figure 4;

Figure 11 depicts a flowchart of further details regarding operation 604, generation of an educated query message by the first messaging wizard in accordance with embodiments supporting Figure 5;

20 Figure 12 depicts a flowchart of further details regarding operation 638, processing the educated query message using the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 6;

Figure 13 depicts a flowchart of further details regarding operation 642, generation of a patient medical query message by the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 6;

- 5 Figure 14 depicts a flowchart of further details regarding operation 678, processing the received patient medical query message by the second messaging wizard in accordance with embodiments supporting Figure 7;

Figure 15 depicts a flowchart of further details regarding operation 722, copying the patient response message with appended physician billing data to
10 the medical profiler by the second messaging wizard in accordance with embodiments supporting Figure 8;

Figure 16 depicts a flowchart of further details regarding operation 748, processing the received, copied the patient response message with appended physician billing data using the medical profiler process performed by the
15 medical profiler in accordance with embodiments supporting Figure 9;

Figure 17 depicts a flowchart of further details regarding operation 708, generating patient response message using the second message wizard in accordance with embodiments supporting Figure 8;

Figure 18 depicts a flowchart of further details regarding operation 778,
20 processing the received patient response message using the first message wizard in accordance with embodiments supporting Figure 10;

Figure 19 depicts a flowchart of further details regarding operation 712, sending the patient response message with appended physician billing data

using the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 8;

Figure 20 depicts a flowchart of further details regarding operation 708, generating the patient response message using the second message wizard 5 in accordance with embodiments supporting Figure 8;

Figure 21 depicts a flowchart of operations of the medical profiler process performed by the medical profiler in accordance with alternative embodiments supporting Figure 4;

Figure 22 depicts a flowchart of further details regarding operation 1048, 10 processing the patient response message destined for the patient using the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 21;

Figure 23 depicts a flowchart of further details regarding operation 642, generating a patient medical query message using the medical profiler 15 process performed by the medical profiler in accordance with embodiments;

Figure 24 depicts a flowchart of operations using the third message wizard on the physician extender computer in accordance with embodiments supporting Figure 9;

Figure 25 depicts a flowchart of further details regarding operation 602, 20 generating the physician-viewable patient medical query message in accordance with embodiments supporting Figures 7;

Figure 26 depicts a flowchart of further details regarding operation 708, generating the patient response message using the second message wizard in accordance with embodiments supporting Figure 8;

Figure 27 depicts a flowchart of further operations embodying the third message wizard in accordance with certain embodiments;

Figure 28 depicts a flowchart of further operations embodied in the message profiler process in accordance with certain embodiments;

Figure 29 depicts a flowchart of further operations embodied in a second messaging wizard in accordance with certain embodiments supporting prescriptions;

Figure 30 depicts a flowchart of further operations embodied in a medical profiler in accordance with certain embodiments supporting prescriptions;

Figure 30A depicts a flowchart of further details regarding operation 1311, integrating a prescription order in the medical profiler process in accordance with embodiments supporting Figure 30;

Figure 31 depicts a flowchart of further operations embodied in the first messaging wizard in accordance with certain embodiments supporting prescriptions;

Figure 32 depicts a flowchart of further details of operation 1352, ordering the embedded prescription of Figure 31;

Figure 33 depicts a flowchart of further details of operation 1170 of Figure 25;

Figure 34 depicts a flowchart of further details of operation 1222 of Figure 27;

- Figure 35 depicts a flowchart of further details of operation 1402 of Figure 34;
- Figure 36 depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments supporting billing patients;
- 5 Figure 37 depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments further supporting billing patients;
- Figure 38 depicts a flowchart of further operations embodying a billing process in accordance with certain embodiments;
- 10 Figure 39 depicts a flowchart of further details of operation 1518 of Figure 38;
- Figure 40 depicts a flowchart of further details of operation 708 of Figure 8 supporting a physician requesting a second opinion in accordance with certain embodiments;
- 15 Figure 41 depicts a flowchart of operations embodied in the second message wizard supporting a second physician and a second opinion request in accordance with certain embodiments;
- Figure 42 depicts a flowchart of operations embodied in a second message wizard supporting maintaining a collection of patient response templates in accordance with certain embodiments;
- 20 Figure 43 depicts a flowchart of further details of operation 704 of Figure 8 supporting use of a patient response template to create a first-physician response in accordance with certain embodiments;

Figure 44 depicts a flowchart of operations embodied in a first messaging wizard to support maintaining a collection of patient problem templates in accordance with certain embodiments;

5 Figure 45 depicts a flowchart of further details of operation 604 of Figure 5 supporting use of a patient problem template to create an educated medical query using a first medical wizard in accordance with certain embodiments;

Figure 46 depicts a flowchart of operations embodied in a medical profiler process to generate and send patient problem templates to patients in accordance with certain embodiments;

10 Figure 47 depicts a flow diagram of a medical profiler process in accordance with certain embodiments;

Figure 48 depicts a flow diagram of a computer program capable of receiving a message from a physician containing a prescription and responding to the message containing the prescription by generating and sending a prescription 15 order message in accordance with certain embodiments in accordance with an aspect of the invention;

Figure 49 depicts a flowchart of further details of the code of 1854 of Figure 48 supporting receiving a patient response message with an embedded prescription in accordance with certain embodiments; and

20 Figure 50 depicts a flowchart of further details of the code of 1862 of Figure 48 supporting responding to the patient response message in accordance with certain embodiments.

Figure 50A depicts a flowchart of further details of 1311 of Figure 30 supporting integrating a prescription order in accordance with certain embodiments;

5 Figure 50B depicts a flowchart of further details of 1324 of Figure 30A supporting generating a pharmacy prescription order in accordance with certain embodiments;

Figure 50C depicts a flowchart of further details of 1326 of Figure 30A supporting sending a pharmacy prescription order to a pharmacy in accordance with certain embodiments;

10 Figure 50D depicts a flowchart of further details of 1106 of Figure 23 supporting determining a routing chain of physician extenders and embedding the routing chain into a second patient query in accordance with certain embodiments;

15 Figure 50E depicts a flowchart of further details of 1178 of Figure 24 supporting determining successor physician extenders in an embedded physician extender routing chain, generating a successor medical query message with embedded proposed patient response and sending the successor patient medical query to the successor physician extender;

20 Figure 50F depicts a flowchart of further details of 646 of Figure 6 supporting generating a routing tree of physicians with first physician final destination and source list of physicians, generating and sending a source medical query to each physician included in the physician source list;

Figure 51 depicts a more detailed flow diagram of an embodiment of the invention in accordance with certain embodiments;

Figure 52 depicts an interactive flow between a client using a first message interface, service profiler performing a service profiler process and service provider using a second message interface in accordance with an embodiment of the invention;

Figure 52A depicts an interactive flow between a client using a first message interface, service profiler performing a service profiler process and service provider using a second message interface in accordance with a further embodiment of the invention;

Figure 53 depicts a flowchart of operations supporting the generation and sending of an educated query by a client using the first message interface in accordance with embodiments supporting Figure 52;

Figure 54 depicts a flowchart of operations supporting the reception, processing, logging of the educated query message from the client, and the generation and sending of the client service query message to a service provider by the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 52;

Figure 55 depicts a flowchart of operations supporting reception, processing and viewing the client service query message by the second message interface for the service provider in accordance with embodiments supporting Figure 52;

Figure 56 depicts a flowchart of operations supporting reception, generation and sending a client response message, as well as copying the client response message with an appended service provider billing data to the service profiler address in accordance with embodiments supporting Figure 52;

Figure 57 depicts a flowchart of operations supporting the reception, processing, logging the copied client response message with an appended service provider billing data by the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 52;

10 Figure 58 depicts a flowchart of operations supporting reception, processing and display of the client response message using the first message interface on the client operated computer in accordance with embodiments supporting Figure 52;

15 Figure 59 depicts a flowchart of further details regarding operation 2604, generation of an educated query message by the first message interface in accordance with embodiments supporting Figure 53;

Figure 60 depicts a flowchart of further details regarding operation 2638, processing the educated query message using the service profiler process performed by the service profiler in accordance with embodiments supporting 20 Figure 54;

Figure 61 depicts a flowchart of further details regarding operation 2642, generation of a client service query message by the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 54;

Figure 62 depicts a flowchart of further details regarding operation 2678, processing the received client service query message by the second message interface in accordance with embodiments supporting Figure 55;

Figure 63 depicts a flowchart of further details regarding operation 2722,

- 5 copying the client response message with appended service provider billing data to the service profiler by the second message interface in accordance with embodiments supporting Figure 56;

Figure 64 depicts a flowchart of further details regarding operation 2748,

processing the received, copied the client response message with appended

- 10 service provider billing data using the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 57;

Figure 65 depicts a flowchart of further details regarding operation 2708,

generating client response message using the second message interface in

accordance with embodiments supporting Figure 56;

- 15 Figure 66 depicts a flowchart of further details regarding operation 2778, processing the received client response message using the first message interface in accordance with embodiments supporting Figure 58;

Figure 67 depicts a flowchart of further details regarding operation 2712,

sending the client response message with appended service provider billing

- 20 data using the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 56;

Figure 68 depicts a flowchart of further details regarding operation 2708, generating the client response message using the second message interface in accordance with embodiments supporting Figure 56;

Figure 69 depicts a flowchart of operations of the service profiler process performed by the service profiler in accordance with alternative embodiments supporting Figure 52;

Figure 70 depicts a flowchart of further details regarding operation 3048, processing the client response message destined for the client using the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 69;

Figure 71 depicts a flowchart of further details regarding operation 2642, generating a client service query message using the service profiler process performed by the service profiler in accordance with embodiments;

Figure 72 depicts a flowchart of operations using the third message interface on the service extender computer in accordance with embodiments supporting Figure 57;

Figure 73 depicts a flowchart of further details regarding operation 2602, generating the service-provider-viewable client service query message in accordance with embodiments supporting Figures 55;

Figure 74 depicts a flowchart of further details regarding operation 2708, generating the client response message using the second message interface in accordance with embodiments supporting Figure 56;

Figure 75 depicts a flowchart of further operations embodying the third message interface in accordance with certain embodiments;

Figure 76 depicts a flowchart of further operations embodied in the message profiler process in accordance with certain embodiments;

- 5 Figure 77 depicts a flowchart of further operations embodied in a second message interface in accordance with certain embodiments supporting service recommendations;

Figure 78 depicts a flowchart of further operations embodied in a service profiler in accordance with certain embodiments supporting service

10 recommendations;

Figure 78A depicts a flowchart of further details regarding operation 3311, integrating a service order in the service profiler process in accordance with embodiments supporting Figure 78;

- Figure 79 depicts a flowchart of further operations embodied in the first message interface in accordance with certain embodiments supporting service recommendations;

Figure 80 depicts a flowchart of further details of operation 3352, ordering the embedded service recommendation of Figure 79;

Figure 81 depicts a flowchart of further details of operation 3170 of Figure 73;

- 20 Figure 82 depicts a flowchart of further details of operation 3222 of Figure 75;

Figure 83 depicts a flowchart of further details of operation 3402 of Figure 82;

Figure 84 depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments supporting billing clients;

Figure 85 depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments further supporting billing clients;

Figure 86 depicts a flowchart of further operations embodying a billing process in accordance with certain embodiments;

Figure 87 depicts a flowchart of further details of operation 3518 of Figure 86;

Figure 88 depicts a flowchart of further details of operation 2704 of Figure 56 supporting a service provider requesting a second opinion in accordance with certain embodiments;

Figure 89 depicts a flowchart of operations embodied in the second message interface supporting a second service provider and a second opinion request in accordance with certain embodiments;

Figure 90 depicts a flowchart of operations embodied in a second message interface supporting maintaining a collection of client response templates in accordance with certain embodiments;

Figure 91 depicts a flowchart of further details of operation 2704 of Figure 56 supporting use of a client response template to create a first-service-provider response in accordance with certain embodiments;

- Figure 92 depicts a flowchart of operations embodied in a first message interface to support maintaining a collection of client problem templates in accordance with certain embodiments;
- 5 Figure 93 depicts a flowchart of further details of operation 2604 of Figure 53 supporting use of a client problem template to create an educated service query using a first service interface in accordance with certain embodiments;
- Figure 94 depicts a flowchart of operations embodied in a service profiler process to generate and send client problem templates to clients in accordance with certain embodiments;
- 10 Figure 95 depicts a flow diagram of a service profiler process in accordance with certain embodiments;
- Figure 96 depicts a flow diagram of a computer program capable of receiving a message from a service provider containing a service recommendation and responding to the message containing the service recommendation by generating and sending a service order message in accordance with certain embodiments in accordance with an aspect of the invention;
- 15 Figure 97 depicts a flowchart of further details of the code of 3854 of Figure 96 supporting receiving a client response message with an embedded service recommendation in accordance with certain embodiments; and
- 20 Figure 98 depicts a flowchart of further details of the code of 3862 of Figure 96 supporting responding to the client response message in accordance with certain embodiments.

Figure 98A depicts a flowchart of further details of 3311 of Figure 78 supporting integrating a service order in accordance with certain embodiments;

Figure 98B depicts a flowchart of further details of 3324 of Figure 78A

- 5 supporting generating a supplier service order in accordance with certain embodiments;

Figure 98C depicts a flowchart of further details of 3326 of Figure 78A supporting sending a supplier service order to a supplier in accordance with certain embodiments;

- 10 Figure 98D depicts a flowchart of further details of 3106 of Figure 71 supporting determining a routing chain of service extenders and embedding the routing chain into a second client query in accordance with certain embodiments;

Figure 98E depicts a flowchart of further details of 3178 of Figure 72

- 15 supporting determining successor service extenders in an embedded service extender routing chain, generating a successor medical query message with embedded proposed client response and sending the successor client medical query to the successor service extender;

Figure 98F depicts a flowchart of further details of 2646 of Figure 53

- 20 supporting generating a routing tree of service providers with first service provider final destination and source list of service providers, generating and sending a source medical query to each service provider included in the service provider source list;

Detailed Description of the Invention

Figure 1 and 2 refer to prior art and were previously discussed in the Background of the invention.

Discussion of Primary Terms as used herein:

- 5 A message will refer to a communication session with a source and a destination whose contents can be described in a digital fashion. Examples of messages include but are not limited to phone mail, email and pager messages.

A medical profile of a patient is a collection of information residing in some
10 computer accessible media which from time to time a computer may be able to access.

The medical profiler process is the system-wide activities which are performed in an automated fashion by the workflow engine to facilitate the medical communication between patients, physicians, physician extenders and
15 pharmacies to support at least the following: medical queries, replies and transactions involved in prescriptions.

The workflow engine is the mechanism performing the collection of operations known as the medical profiler process. It has at least one address on the network shared with patients, physicians, physician extenders and
20 pharmacies. Note that this shared network may in fact be partitioned into a collection of networks, each possessing gateways, firewalls and the like as is well known in the art. Note that the workflow engine may include but is not

limited to one computer, and in fact, in certain embodiments preferably involves more than one server computer as will be discussed later.

A patient as used herein will have two components of meaning: the first component being the entity about whose health the medical profile, query messages, response message and prescriptions are directed; the second is the responsible adult acting for the patient in all the transactions, such as generating the query messages, receiving and considering the response messages and ordering the prescriptions. Note that a list of the first component entities includes but is not limited to pets, trees, children, the physically incapacitated, the mentally incapacitated and the emotionally incapacitated.

Figure 3A depicts a flow diagram of an embodiment of the invention in accordance with certain embodiments. There are two main flows of information likely to be prevalent with users of this invention. The most common flow would be a patient 200 initiate 202 query 204, where the patient will launch an electronic message 206. These messages can subcategorized in four main groups- Request a refill, Schedule an appointment, Consult symptoms with the physician 212 and page the physician 212. The second possible flow is initiation of messages by the clinic/physician 212 aimed at broadcasting information to patients 200.

At the time of registration or post sending the first consultation/refill request the patient 200 is being asked to fill in his/her medical profile 208. Medical profile 208 would contain the patient 200's medication list, allergies, problems and demographics. The medical profile 208 is then validated by the patient 200's medical staff and is approved. Once approved the medical profile 208 is

locked and the patient **200** may not alter the profile. The profile **208** is updated automatically by transactions made by the workflow engine or by the patient's medical staff. In the event that the patient **200** wants to edit the medical profile **208** then the patient initiates a query **204** to the medical staff informing them 5 that the profile needs corrections. The medical staff can with one click approve the patient query **204** and update the profile **208**.

Figure **3A** portrays the typical flow of a patient **200** initiated query **204**. The patient **200** through the use of a wizard **202**, initiates an educated query **204**. Using a problem-related database and knowledge of the patient medical 10 profile **208**, the application generates a problem specific questioner (form). This form is both problem and patient **200** specific. The form is advantageous in that it removes the need for a great deal of typing on behalf of the patient **200**. It is further advantageous in decreasing the need for message ping pong between the patient **200** and the physician **212** due to insufficient data. 15 It is further advantageous in allowing the physician **212** to read a more readable and intelligent format than that of a patient **200** free text waffle.

The next step in the flow of the message is attaching the summary of the patient medical record or as we call it 'medical profile' **208** to the message. The patient **200** initiates the medical profile at the point of registration to the 20 workflow engine or at the time of the first refill/consult request. The patient **200** is asked by the workflow engine to fill in his/her medical profile i.e. problems allergies and medications. This medical profile **208** is interactive and will be later validated by the nurse **242** or physician **212**. Once validated for the first time it is locked and the patient **200** can no longer tamper with the 25 data. Any prescription **252** sent through the workflow engine automatically

updates the medical profile **208**. The patient **200** may add data to the 'locked' medical profile **208** but that data will not be embedded in the medical profile **208** prior to the physician **212** or his staff validating the new data. The workflow engine attaches the medical profile **208** to any patient related document thus avoids the need for a chart pull at the point of care, plus it allows the patient **200** to present the medical profile **208** to foreign physicians **212** when on the move.

The workflow engine then takes the message and the medical profile **208** attached and routes it to the proper physician extender according to the type of message sent. As an example, a refill messages would be routed to the nurse **242**, an urgent scheduling query will also get to the nurse **242**, a non-urgent query will be routed to the scheduling desk. This process allows the physician **212** to share the workload with his extenders.

Each member of the physician's staff can create his own canned replies **246**. These are replies that were typed once by the staff were saved and may be pasted with two clicks to message bodies of future replies. With many physicians complaining about repetitious replies to their patients this tool allows both the saving of time and a reduction in typing need. The pasted 'canned replies' are then editable and customizable.

Once edited and filled by the medical staff the messages are routed to the physician **212** who in most cases needs to do nothing more then approve his staff's work and in a single click send the message to the patient **200**. The physician **212** at this stage may determine a fee for the service and add educational material **220** and pointers (from a library) to sites of further patient education. The workflow engine notifies the patient **200** via regular e-mail

(patient@aol.com) that a message is waiting for him in his Healinx inbox and provides an hyperlink to lead the patient **200** to his Healinx inbox.

The physician/physician extender may also prescribe medication and attach it to the outgoing message, this in turn checks the medication using a licensed database against the patient's medical profile for drug/drug, drug/allergy conflicts and alerts the physician. It also allows us to attach education material to the prescription alerting the patient **200** for possible side effects and actions that should or should not be taken with the prescribed medication. Education material **220** taken from the database is attached to the prescription and can be viewed by the patient **200**.

The patient **200** reading the message views the embedded prescription and has the choice of ordering **264** the prescription in the pharmacy of his choice to be delivered from an online pharmacy **260** or to be picked up from his favorite brick and mortar traditional pharmacy **260**. In addition in the event that the patient **200** is on the move then he may choose with a single click the closest pharmacy **260** and the prescription will be electronically shipped to that pharmacy **260** at no extra cost or hassle.

Physicians **212** may set the workflow engine to allow patient **200** paging, the message **204** typed by the patient **200** will be sent to the physician **212** over pager or phone. The physician **212** can then request **214** additional information such as the patient medical profile and initiate a call back **216** to the patient **200**. The physician **212** may set up the times of day he willing to be accessible by pager and the pricing per beep dependant on the time of day.

Further embodiments of the invention support the workflow engine creating routing chains of physician extenders starting with a first physician extender proceeding through successor physician extenders until the routing chain terminates with a physician reviewing the collective proposed patient response. The routing chain may be generated by the workflow engine based upon the patient's educated query message.

Further embodiments of the invention support the workflow engine creating routing trees of physicians with patent query messages starting with a source list of physicians, possibly routing to intermediate physicians and culminating in a first physician who reviews the collective physician responses to their respective patient medical queries.

Using outsourced solutions, the patients **200** can monitor their readings of blood pressure, sugar level, or other monitoring and transmit it to Healinx. We then take the readings and imbed these in the patient medical profile **208**. If abnormal readings are found both patient **200** and physician **212** are notified.

Through an embedded database and the patient's medical profile **208** the workflow engine searches for patient **200** as to who should schedule a preventive examination. As an example the workflow engine would remind all women 25-45 to schedule a mammogram. The workflow engine will hold a customized preventive health calendar per patient **200** and remind that patient **200** to schedule an appointment if needed.

Through the medical profile **208** of patient **200**'s the workflow engine will allow clinics to search for certain patient characteristics. Using this filter the clinic can rapidly create variable patient mailing lists to which they can mail at once.

For example in the event that the clinic seeks to contact all males aged 25-45 who are smokers that take Prozac.

Further embodiments of the invention include the capability for a vendor to author templates and routing them through an authoring tool. Templates would be descriptions of the most common customer queries. The templates would support the customer diagnostics of the problem and allow the customer to provide a comprehensive description of the problem encountered.

The customer can then be provided with the most common solutions to the diagnosis. And allow the client to choose whether the off-the-shelf reply is adequate or not. If not then the customer may send the query to the vendor. For premium pricing the customer may page and get an immediate phone response.

Identifying the template used allows triage of the mail into the most adequate department for reply. This allows the people in charge of replying to customize their replies and paste these in the message body. The message according to its severity can then be sent to a supervisor for approval or directly to the patient **200**.

The vendor may attach a prescription (the spare part needed) and allow the patient **200** to choose the most convenient service center. The order is then sent to a service center of the customer's **200** choice and authorization and pricing of the entire service are controlled by the vendor.

Figure **3B** depicts a flow diagram of an embodiment of the invention in accordance with certain embodiments. Patient **200** is the primary initiator of this invention. Arrow **202** depicts the interactions of patient **200** to create the

educated query message **204**. The educated query message **204** is an optimized medical query directed by the patient to address concerns and conditions involving the patient. Arrow **206** depicts the sending of educated query message **204** to the medical profile **208** which is managed by the
5 medical profiler process. The workflow engine performs the various medical profiler process operations. More will be said about the workflow engine shortly. Arrow **210** depicts interactive communication between the workflow engine **208** and the physicians **212** primarily regarding the medical profiler.
Physicians **212** are the central destination of patient generated educated
10 medical query messages as sent by **210** from the medical profiler process to the physician **212**. Arrow **214** depicts the response of physician **212** to the educated query message, generating a consultative response **216**. Consultation **216** provides the basis of the patient response message **226**. Arrow **218** depicts the inclusion of the physician consultative response **216**
15 with educational material **220**. Educational material **220** is included in certain, but not all cases, to meet mandated regulations as well as provide the physicians a mechanism to distribute standard material regarding various conditions and treatments. Arrow **222** depicts the workflow engine activities required to incorporate the consultative response and included materials **220**
20 with billing information (charging) **224**. Charging **224** performs tasks of notifying a patient medical profile of the consultative transaction, what was the query, response, educational materials included and the medical service expenses. Arrow **226** depicts the actual patient response message derived from **224** query, physician response, educational materials included and the
25 medical service expenses sent to patient **200**.

Arrow **230** depicts the message information flow from the workflow engine to physician extender **232**. Physician extenders **232** perform a number of medical service tasks under the direction of physicians **212**. Arrow **234** depicts the sending of proposed patient response messages generated by physician extenders **232** to a physician **212**. Arrow **240** depicts another message information flow from the workflow engine to a nurse **242**. While nurses are physician extenders, a nurse **242** performs a specific additional task distinguishing them from other physician extenders, such as physician assistants and administrators. Nurse **242** can propose prescription refills for example. Arrow **244** depicts the sending of proposed patient response message, which may further include proposed embedded prescription refills, from nurse **242** to physician **246**.

Physician **212** performs a review on the proposed patient response messages from physician extenders, including nurses, as delivered by arrows **234** and **244**. Template replies **246** offer the capability for physicians to optimize the quality and efficiency of response in making many standard replies. Arrow **248** depicts the interaction between template replies **246** and physician **212**.

Arrow **250** depicts the information and activity flow based upon the consultative response **216** and the placing of a prescription message **252**. Prescription message **252** is created based upon the physician's consultative response **216**, which in turn is based upon the patient's medical query message and possibly a nurse's proposed prescription refill. Arrow **254** depicts sending a prescription message **252** to ordering process **256**. Patient **200** receives the patient response message **226**, and may respond by ordering the embedded prescription, which is depicted by arrow **264** indicating

a patient prescription message sent to ordering process **256**. Ordering process **256** waits until both the physician prescription message **254** and patient prescription message **264** have been received and processed before the order **258** is actually placed with pharmacy **260**. Pharmacy **260** sends the
5 prescription to patient **300** as indicated by arrow **362**.

Figure 4 depicts an interactive flow between a patient using a first messaging wizard, workflow engine performing a medical profiler process and physician using a second messaging wizard in accordance with an embodiment of the invention. Patient **300** interacts **302** with patient operated computer **304**,
10 which can access **306** and perform the operations of first messaging wizard **308**. Physician **350** interacts **352** with physician operated computer **354**, which can access **356** and perform the operations of second messaging wizard **358**. Physician extender **400** interacts **402** with physician extender operated computer **404**, which can access **406** and perform the operations of
15 second messaging wizard **408**.

Patient **300** using first messaging wizard **308** on patient operated computer **304** generates **310** educated query message **312** and sends it **314** to workflow engine **320** where it is received by medical profiler process **322**. Medical profiler process **322** generates **324** patient message log entry **326**,
20 which is added **328** to the patient medical profile **330**. Medical profiler process **322** further generates **340** patient medical query message **342**, which is sent **344** to physician operated computer **354**.

Physician **350** using second messaging wizard **358** on physician operated computer **354** receives and responds to the patient medical query message
25 **342**, generating **360** a patient response message **362**, which in certain

embodiments is sent **364** directly to the patient operated computer **304**. In certain alternative embodiments, patient response message **362** is sent **370** to the workflow engine, where the medical profiler process **322** then sends **372** a version to the patient operated computer **304**. Physician **350** using **5** second messaging wizard **358** on physician operated computer **354** further responds to the patient medical query message **342**, generating a patient response message with appended physician billing data **382**, which is sent **384** to the workflow engine, where the medical profiler process **322** then generates **390** a patient response log entry **392** which is added **394** to the **10** patient medical profile **330**.

In certain situations, a prescription is embedded into patient response message **362** by the physician **350** using second messaging wizard **358** on physician operated computer **354** in response to the patient medical query message **342**, which is embedded into the patient response message **362**. **15** Physician **350** using second messaging wizard **358** on physician operated computer **354** also generates **480** physician prescription message **482**, which is sent **484** to the workflow engine using the medical profiler process **322**. Patient **300** using first messaging wizard **308** on patient operated computer **304** generates **490** patient prescription order message **492** and sends it **494** **20** to workflow engine **320** where it is received by medical profiler process **322**. Once both physician prescription message **482** and patient prescription order message **492** have been received and authenticated, the medical profiler process **322** generates **500** a pharmacy prescription order message **502** which is sent **504** to the pharmacy computer **506**.

Medical profiler process **322** accesses **510** the patient medical profile **330** to generate **512** patient billing report message **514** which is sent **516** to billing system **518**. Note that the billing system **518** in certain embodiments is a separate system element external to the workflow engine. In certain 5 alternative embodiments, billing system **518** resides within the operations performed by the workflow engine. In certain further embodiments, billing system **518** is part of the medical profiler process.

Medical profiler process **322** further generates **400** a second patient medical query message **402**, which is sent **404** to physician extender operated 10 computer **414**. Physician extender **410** using third messaging wizard **418** on physician operated computer **414** receives and responds to the second patient medical query message **412**, generating **430** a proposed patient response message **432**, which is sent **434** directly to the physician operated computer **354**, where it is inserted into the patient medical query message 15 **342**. In certain alternative embodiments, patient response message **432** is sent **436** to the workflow engine, where the medical profiler process **322** then sends a version to the physician operated computer **354**. Physician extender **410** using third messaging wizard **418** on physician operated computer **414** further responds **440** to the second patient medical query message **402**, 20 generating a proposed patient response message with appended physician extender billing data **442**, which is sent **444** to the workflow engine, where the medical profiler process **322** then generates **450** a proposed patient response with appended physician extender billing data log entry **452** which is added **454** to the patient medical profile **330**.

Note that in the flowcharts included herein, the starting operation of a flowchart may perform operations to allocate systems resources for use by the subsequent operations of the flowchart in certain embodiments. The starting operation of a flowchart may further perform initialize systems
5 resources in certain embodiments.

Note also that in the flowcharts included herein, the terminating or exit operation of a flowchart may perform operations to release allocated systems resources used by the subsequent operations of the flowchart in certain embodiments. The terminating operation of a flowchart may further perform a
10 “return” operation in certain embodiments. Alternatively, the terminating operation of a flowchart may not perform a “return” operation in certain embodiments.

Figure 5 depicts a flowchart of operations supporting the generation and sending of an educated query by a patient using the first messaging wizard in
15 accordance with embodiments supporting Figure 4. Operation 600 starts the operations of this flowchart. Arrow 602 directs the flow of execution from operation 600 to operation 604. Operation 604 performs generating of an educated query message. Arrow 606 directs execution from operation 604 to operation 608. Operation 608 performs sending the educated query message
20 to the workflow engine. Arrow 610 directs execution from operation 608 to operation 612. Operation 612 terminates the operations of this flowchart.

Figure 6 depicts a flowchart of operations supporting the reception, processing, logging of the educated query message from the patient, and the generation and sending of the patient medical query message to a physician
25 by the medical profiler process performed by the workflow engine in

accordance with embodiments supporting Figure 4. Operation **630** starts the operations of this flowchart. Arrow **632** directs the flow of execution from operation **630** to operation **634**. Operation **634** performs receiving the educated query message at the workflow engine. Arrow **636** directs 5 execution from operation **634** to operation **638**. Operation **638** performs processing the received educated query message to create the processed, received educated query message. Arrow **640** directs execution from operation **638** to operation **642**. Operation **642** performs generating a patient medical query message. Arrow **644** directs execution from operation **642** to 10 operation **646**. Operation **646** performs sending the patient medical query message to first physician at corresponding physician address. Arrow **648** directs execution from operation **646** to operation **650**. Operation **650** terminates the operations of this flowchart.

In certain embodiments, operation **646** further includes selecting a first 15 physician. In certain further embodiments, operation **646** further includes selecting a first physician based upon the received educated query message. In certain further embodiments, operation **646** further includes selecting a first physician based upon the processed, received educated query message.

Arrow **652** directs the flow of execution from starting operation **638** to 20 operation **654**. Operation **654** performs generating a patient message log entry in the patient medical profile. Arrow **656** directs execution from operation **654** to operation **650**.

Figure 7 depicts a flowchart of operations supporting reception, processing 25 and viewing the patient medical query message by the second message wizard for the physician in accordance with embodiments supporting Figure 4.

Operation **670** starts the operations of this flowchart. Arrow **672** directs the flow of execution from operation **670** to operation **674**. Operation **674** performs receiving the patient query message. Arrow **676** directs execution from operation **674** to operation **678**. Operation **678** performs processing the received patient medical query message to create the processed, received patient medical message. Arrow **680** directs execution from operation **678** to operation **682**. Operation **682** performs generating a physician-viewable patient medical query message from the processed, received patient medical query message. Arrow **684** directs execution from operation **682** to operation **686**. Operation **686** performs displaying the physician-viewable patient medical query message. Arrow **688** directs execution from operation **686** to operation **690**. Operation **690** terminates the operations of this flowchart.

Figure 8 depicts a flowchart of operations supporting reception, generation and sending a patient response message, as well as copying the patient response message with an appended physician billing data to the workflow engine in accordance with embodiments supporting Figure 4. Operation **700** starts the operations of this flowchart. Arrow **702** directs the flow of execution from operation **700** to operation **704**. Operation **704** performs responding to the physician-viewable patient medical query message to create a first-physician response. Arrow **706** directs execution from operation **704** to operation **708**. Operation **708** performs generating a patient response message from the first-physician response. Arrow **710** directs execution from operation **708** to operation **712**. Operation **712** performs sending the patient response message to the patient at the corresponding patient address. Arrow **714** directs execution from operation **712** to operation **716**. Operation **716** terminates the operations of this flowchart.

Arrow 720 directs the flow of execution from starting operation 708 to operation 722. Operation 722 performs copying the patient response message with appended physician billing data to workflow engine. Arrow 724 directs execution from operation 722 to operation 716.

- 5 Figure 9 depicts a flowchart of operations supporting the reception, processing, logging the copied patient response message with an appended physician billing data by the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure 4. Operation 740 starts the operations of this flowchart. Arrow 742 directs the
- 10 flow of execution from operation 740 to operation 744. Operation 744 performs receiving the copied patient response message with appended physician billing data. Arrow 746 directs execution from operation 744 to operation 748. Operation 748 performs processing the received, copied patient response message with appended physician billing data to create the
- 15 processed, received, copied patient response message with appended physician billing data. Arrow 750 directs execution from operation 748 to operation 752. Operation 752 performs generating a patient response log entry in patient medical profile from the processed, received, copied patient response message with appended physician billing data. Arrow 754 directs
- 20 execution from operation 752 to operation 756. Operation 756 terminates the operations of this flowchart.

- Figure 10 depicts a flowchart of operations supporting reception, processing and display of the patient response message using the first messaging wizard on the patient operated computer in accordance with embodiments supporting
- 25 Figure 4. Operation Q0 starts the operations of this flowchart. Arrow 772

directs the flow of execution from operation **770** to operation **774**. Operation **774** performs receiving the patient response message. Arrow **776** directs execution from operation **774** to operation **778**. Operation **778** performs processing the received patient response message, to create a processed, 5 received patient response message. Arrow **780** directs execution from operation **778** to operation **782**. Operation **782** performs displaying the processed, received patient response message. Arrow **784** directs execution from operation **782** to operation **786**. Operation **786** terminates the operations of this flowchart.

10 Figure **11** depicts a flowchart of further details regarding operation **604**, generation of an educated query message by the first messaging wizard in accordance with embodiments supporting Figure **5**. Arrow **800** directs the flow of execution from starting operation **604** to operation **802**. Operation **802** performs providing a patient-to-profiler authentication key. Arrow **804** directs 15 execution from operation **802** to operation **806**. Operation **806** performs encrypting the educated query message with patient-to-profiler authentication key. Arrow **808** directs execution from operation **806** to operation **810**. Operation **810** terminates the operations of this flowchart.

Figure **12** depicts a flowchart of further details regarding operation **638**, 20 processing the educated query message using the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure **6**. Arrow **820** directs the flow of execution from starting operation **638** to operation **822**. Operation **822** performs providing a profiler-from-patient authentication key. Arrow **824** directs execution from operation 25 **822** to operation **826**. Operation **826** performs decrypting the received,

educated query message with profiler-from-patient authentication key. Arrow 828 directs execution from operation 826 to operation 830. Operation 830 terminates the operations of this flowchart.

Figure 13 depicts a flowchart of further details regarding operation 642, 5 generation of a patient medical query message by the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure 6. Arrow 850 directs the flow of execution from starting operation 642 to operation 852. Operation 852 performs providing profiler-from-first-physician authentication key. Arrow 854 directs execution from 10 operation 852 to operation 856. Operation 856 performs encrypting patient medical query message with profiler-from-first-physician authentication key. Arrow 858 directs execution from operation 856 to operation 860. Operation 860 terminates the operations of this flowchart.

Figure 14 depicts a flowchart of further details regarding operation 678, 15 processing the received patient medical query message by the second messaging wizard in accordance with embodiments supporting Figure 7. Arrow 880 directs the flow of execution from starting operation 678 to operation 882. Operation 882 performs providing a first-physician-from-profiler authentication key. Arrow 884 directs execution from operation 882 to 20 operation 886. Operation 886 performs decrypting the received patient medical query message with the first-physician-from-profiler authentication key. Arrow 888 directs execution from operation 886 to operation 890. Operation 890 terminates the operations of this flowchart.

Figure 15 depicts a flowchart of further details regarding operation 722, 25 copying the patient response message with appended physician billing data to

the workflow engine by the second messaging wizard in accordance with embodiments supporting Figure 8. Arrow 900 directs the flow of execution from starting operation 722 to operation 902. Operation 902 performs providing a first-physician-to-profiler authentication key. Arrow 904 directs 5 execution from operation 902 to operation 906. Operation 906 performs encrypting the patient response message with appended physician billing data with the first-physician-to-profiler authentication key. Arrow 908 directs execution from operation 906 to operation 910. Operation 910 performs sending first-physician-to-profiler encrypted patient response message with 10 appended physician billing data to the workflow engine. Arrow 912 directs execution from operation 910 to operation 914. Operation 914 terminates the operations of this flowchart.

Figure 16 depicts a flowchart of further details regarding operation 748, processing the received, copied the patient response message with appended 15 physician billing data using the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure 9. Arrow 930 directs the flow of execution from starting operation 748 to operation 932. Operation 932 performs providing a profiler-from-first-physician authentication key. Arrow 934 directs execution from operation 932 to operation 936. 20 Operation 936 performs decrypting the received, copied patient response message with appended physician billing data with the profiler-from-first physician authentication key to create the processed, received patient response message with appended physician billing data. Arrow 938 directs execution from operation 936 to operation 940. Operation 940 terminates the 25 operations of this flowchart.

Figure 17 depicts a flowchart of further details regarding operation 708, generating patient response message using the second message wizard in accordance with embodiments supporting Figure 8. Arrow 950 directs the flow of execution from starting operation 708 to operation 952. Operation 952 5 performs providing first-physician-to-patient authentication key. Arrow 954 directs execution from operation 952 to operation 956. Operation 956 performs generating an unencrypted patient response message from the physician-viewable patient medical query message and the first-physician response. Arrow 958 directs execution from operation 956 to operation 960.

10 Operation 960 performs encrypt the unencrypted patient response message with the first-physician-to-patient authentication key to create the patient response message. Arrow 962 directs execution from operation 960 to operation 964. Operation 964 terminates the operations of this flowchart.

Note that operations 952 and 956 may be performed either in the order 15 presented by this flowchart, or in certain alternative embodiments, in the reverse order to that shown, or further alternatively, concurrently with each other.

Figure 18 depicts a flowchart of further details regarding operation 778, processing the received patient response message using the first message 20 wizard in accordance with embodiments supporting Figure 10. Arrow 980 directs the flow of execution from starting operation 778 to operation 982. Operation 982 performs providing a patient-from-first-physician authentication key. Arrow 984 directs execution from operation 982 to operation 986. Operation 986 performs decrypting the received patient response message 25 with the patient-from-first-physician authentication key to create the

processed, received patient response message. Arrow **988** directs execution from operation **986** to operation **990**. Operation **990** terminates the operations of this flowchart.

Figure **19** depicts a flowchart of further details regarding operation **712**,
5 sending the patient response message with appended physician billing data
using the medical profiler process performed by the workflow engine in
accordance with embodiments supporting Figure **8**. Arrow **1000** directs the
flow of execution from starting operation **712** to operation **1002**. Operation
1002 performs sending patient response message destined to patient to
10 workflow engine. Arrow **1004** directs execution from operation **1002** to
operation **1006**. Operation **1006** terminates the operations of this flowchart.

Figure **20** depicts a flowchart of further details regarding operation **708**,
generating the patient response message using the second message wizard
in accordance with embodiments supporting Figure **8**. Arrow **1010** directs the
15 flow of execution from starting operation **708** to operation **1012**. Operation
1012 performs providing the first-physician-to-profiler authentication code.
Arrow **1014** directs execution from operation **1012** to operation **1016**.
Operation **1016** performs providing the patient address as destination address
within the patient response message, to create an unencrypted patient
20 response message with patient address destination. Arrow **1018** directs
execution from operation **1016** to operation **1020**. Operation **1020** performs
encrypting the unencrypted patient response message with the first-physician-
to-profiler authentication code to create the patient response message
destined for the patient at the corresponding patient address. Arrow **1022**

directs execution from operation **1020** to operation **1024**. Operation **1024** terminates the operations of this flowchart.

Note that operations **1012** and **1016** in certain alternative embodiments may be performed in reverse order, and in certain further alternative embodiments,
5 may be concurrently performed.

Figure **21** depicts a flowchart of operations of the medical profiler process performed by the workflow engine in accordance with alternative embodiments supporting Figure **4**. Operation **1040** starts the operations of this flowchart. Arrow **1042** directs the flow of execution from operation **1040**

10 to operation **1044**. Operation **1044** performs receiving the patient response message destined for the patient at the corresponding patient address. Arrow **1046** directs execution from operation **1044** to operation **1048**. Operation **1048** performs processing the received patient response message destined for the patient at the corresponding patient address, to create the patient
15 response message for the patient at the corresponding patient address.

Arrow **1050** directs execution from operation **1048** to operation **1052**. Operation **1052** performs sending the patient response message to the patient at the corresponding patient address. Arrow **1054** directs execution from operation **1052** to operation **1056**. Operation **1056** terminates the
20 operations of this flowchart.

Figure **22** depicts a flowchart of further details regarding operation **1048**, processing the patient response message destined for the patient using the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure **21**. Arrow **1070** directs the flow of execution
25 from starting operation **1048** to operation **1072**. Operation **1072** performs

providing a profiler-from-first-physician authentication key. Arrow **1074** directs execution from operation **1072** to operation **1076**. Operation **1076** performs decrypting the received patient response message destined for the patient at the corresponding patient address to create the processed, received patient
5 response message for the patient at the corresponding patient address. Arrow **1078** directs execution from operation **1076** to operation **1080**. Operation **1080** terminates the operations of this flowchart.

Figure **23** depicts a flowchart of further details regarding operation **642**, generating a patient medical query message using the medical profiler
10 process performed by the workflow engine in accordance with embodiments. Arrow **1100** directs the flow of execution from starting operation **642** to operation **1102**. Operation **1102** performs selecting a first physician extender from the physician extenders. Arrow **1104** directs execution from operation
15 **1102** to operation **1106**. Operation **1106** performs generating a second patient medical query message for the first physician extender. Arrow **1108** directs execution from operation **1106** to operation **1110**. Operation **1110** performs sending the second patient medical query message to the first physician extender at the corresponding physician extender address. Arrow
20 **1112** directs execution from operation **1110** to operation **1114**. Operation **1114** terminates the operations of this flowchart.

Note that in certain embodiments, operation **1102** is based upon the received educated query message. In certain further embodiments, operation **1102** is based upon the processed, received educated query message.

Figure **24** depicts a flowchart of operations using the third message wizard on
25 the physician extender computer in accordance with embodiments supporting

Figure 9. Operation **1150** starts the operations of this flowchart. Arrow **1152** directs the flow of execution from operation **1150** to operation **1154**. Operation **1154** performs receiving a second patient message by first physician extender operating a computer at the corresponding physician extender address. Arrow **1156** directs execution from operation **1154** to operation **1158**. Operation **1158** performs processing the received second patient medical query message to create a processed, received second patient medical query message. Arrow **1160** directs execution from operation **1158** to operation **1162**. Operation **1162** performs generating a physician extender-viewable patient medical query message from the processed, received second patient medical query message. Arrow **1164** directs execution from operation **1162** to operation **1166**. Operation **1166** performs displaying the physician extender-viewable medical query message. Arrow **1168** directs execution from operation **1166** to operation **1170**. Operation **1170** performs responding to the physician extender-viewable medical query message to create a physician extender response. Arrow **1172** directs execution from operation **1170** to operation **1174**. Operation **1174** performs generating the proposed patient response message from physician extender response. Arrow **1176** directs execution from operation **1174** to operation **1178**. Operation **1178** performs sending the proposed patient response message to the first physician at the corresponding physician address. Arrow **1180** directs execution from operation **1178** to operation **1182**. Operation **1182** terminates the operations of this flowchart.

Figure 25 depicts a flowchart of further details regarding operation **682**,
generating the physician-viewable patient medical query message in
accordance with embodiments supporting Figures 7. Arrow **1200** directs the

flow of execution from starting operation **682** to operation **1202**. Operation **1202** performs receiving proposed patient response message from first physician extender. Arrow **1204** directs execution from operation **1202** to operation **1206**. Operation **1206** performs processing the received patient response message to create processed, received patient response message.
5 Arrow **1208** directs execution from operation **1206** to operation **1210**. Operation **1210** performs inserting the processed, received proposed patient response message as part of the physician-viewable patient medical query message. Arrow **1212** directs execution from operation **1210** to operation **1214**. Operation **1214** terminates the operations of this flowchart.
10

Figure 26 depicts a flowchart of further details regarding operation 708, generating the patient response message using the second message wizard in accordance with certain embodiments. Arrow 1220 directs the flow of execution from starting operation 708 to operation 1222. Operation 1222 performs reviewing the proposed patient response message. Arrow 1224 directs execution from operation 1222 to operation 1226. Operation 1226 terminates the operations of this flowchart.

Figure 27 depicts a flowchart of further operations embodying the third message wizard in accordance with certain embodiments. Arrow 1240 directs the flow of execution from starting operation 1240 to operation 1242. Operation 1242 performs generating a copied proposed patient response message with appended physician extender billing data from the physician extender-viewable patient medical query message and first physician extender response. Arrow 1244 directs execution from operation 1242 to operation 1246. Operation 1246 performs sending copied proposed patient

response with appended physician extender billing data to workflow engine.

Arrow **1248** directs execution from operation **1246** to operation **1250**.

Operation **1250** terminates the operations of this flowchart.

Figure **28** depicts a flowchart of further operations embodied in the message

5 profiler process in accordance with certain embodiments. Operation **1270** starts the operations of this flowchart. Arrow **1272** directs the flow of execution from operation **1270** to operation **1274**. Operation **1274** performs receiving the copied proposed patient response message with the appended physician extender billing data. Arrow **1276** directs execution from operation

10 **1274** to operation **1278**. Operation **1278** performs processing the received copied proposed patient response message with the appended physician extender billing data, to create a processed, received copied proposed patient response message with the appended physician extender billing data. Arrow **1280** directs execution from operation **1278** to operation **1282**. Operation

15 **1282** performs generating a physician extender log entry in the medical profile of the patient from the processed, received copied patient response message with the appended physician extender billing data. Arrow **1284** directs execution from operation **1282** to operation **1286**. Operation **1286** terminates the operations of this flowchart.

20 Figure **29** depicts a flowchart of further operations embodied in a second messaging wizard in accordance with certain embodiments supporting prescriptions. Operation **1290** starts the operations of this flowchart. Arrow **1291** directs the flow of execution from operation **1290** to operation **1292**.

Operation **1292** performs generating an embedded prescription. Arrow **1293** directs execution from operation **1292** to operation **1294**. Operation **1294**

performs inserting the embedded prescription into patient response message.

Arrow **1295** directs execution from operation **1294** to operation **1296**.

Operation **1296** performs generating a physician prescription message from the embedded prescription. Arrow **1297** directs execution from operation

5 **1296** to operation **1298**. Operation **1298** performs sending the physician prescription message to the workflow engine. Arrow **1299** directs execution from operation **1298** to operation **1300**. Operation **1300** terminates the operations of this flowchart.

Figure **30** depicts a flowchart of further operations embodied in a medical

10 profiler in accordance with certain embodiments supporting prescriptions.

Operation **1305** starts the operations of this flowchart. Arrow **1306** directs the flow of execution from operation **1305** to operation **1307**. Operation **1307** performs maintaining a list of pharmacies, each with a corresponding pharmacy address. Arrow **1308** directs execution from operation **1307** to

15 operation **1309**. Operation **1309** terminates the operations of this flowchart.

Arrow **1310** directs the flow of execution from starting operation **1305** to operation **1311**. Operation **1311** performs integrating a prescription order.

Arrow **1312** directs execution from operation **1311** to operation **1309**.

Operation **1309** terminates the operations of this flowchart.

20 Note that arrows **1306** and **1310** may be concurrently active, the pharmacy list may be undergoing maintenance operations and the integration of prescription orders may be performed concurrently on either the same computer or distinct computers according to various embodiments of the invention.

Figure 30A depicts a flowchart of further details regarding operation 1311, integrating a prescription order in the medical profiler process in accordance with embodiments supporting Figure 30. Arrow 1315 directs the flow of execution from the starting of operation 1311 to operation 1316. Operation 5 1316 performs receiving the physician prescription message. Arrow 1317 directs execution from operation 1316 to operation 1318. Operation 1318 performs processing the received physician prescription message, to create a processed, received physician prescription message.

Arrow 1319 directs execution from operation 1311 to operation 1320.

10 Operation 1320 performs receiving a patient prescription order message. Arrow 1321 directs execution from operation 1320 to operation 1322. Operation 1322 performs processing the received patient prescription order message to create a processed, received patient prescription order message.

Arrow 1323 directs execution from operation 1322 to operation 1324. Arrow

15 1330 directs execution from operation 1318 to operation 1324. Note that in certain embodiments, both arrows 1323 and 1330 must perform their flow of execution before operation 1324 can execute. Operation 1324 performs generating a pharmacy prescription order message from the processed, received physician prescription message and the processed, received patient 20 prescription order message. Arrow 1325 directs execution from operation 1324 to operation 1326. Operation 1326 performs sending the pharmacy prescription order message to one of the pharmacies at the corresponding pharmacy address. Arrow 1327 directs execution from operation 1326 to operation 1328. Operation 1328 terminates the operations of this flowchart.

Figure 31 depicts a flowchart of further operations embodied in the first messaging wizard in accordance with certain embodiments supporting prescriptions. Operation 1340 starts the operations of this flowchart. Arrow 1342 directs the flow of execution from operation 1340 to operation 1344.

5 Operation 1344 performs responding to the embedded prescription within the processed, received patient response message. Arrow 1346 directs execution from operation 1344 to operation 1348. Operation 1348 terminates the operations of this flowchart.

Arrow 1350 directs the flow of execution from starting operation 1340 to

10 operation 1352. Operation 1352 performs ordering the embedded prescription from the processed, received patient response message. Arrow 1354 directs execution from operation 1352 to operation 1348. Operation 1348 terminates the operations of this flowchart.

15 Note that in certain embodiments, the starting operation may act as a branching mechanism. Such a mechanism can be driven by patient choices via a user interface, such as buttons or pull down menus being selected or pushed.

Figure 32 depicts a flowchart of further details of operation 1352, ordering the embedded prescription of Figure 31. Arrow 1360 directs the flow of execution

20 from starting operation 1352 to operation 1362. Operation 1362 performs generating a patient prescription message from the processed, received patient response message. Arrow 1364 directs execution from operation 1362 to operation 1366. Operation 1366 performs sending the patient prescription message to the workflow engine. Arrow 1368 directs execution

from operation **1366** to operation **1370**. Operation **1370** terminates the operations of this flowchart.

Figure **33** depicts a flowchart of further details of operation **1170** of Figure **25**.

Arrow **1380** directs the flow of execution from starting operation **1170** to
5 operation **1382**. Operation **1382** performs generating a proposed embedded prescription refill in the proposed patient response. Arrow **1384** directs execution from operation **1382** to operation **1386**. Operation **1386** terminates the operations of this flowchart.

Figure **34** depicts a flowchart of further details of operation **1222** of Figure **27**.

10 Arrow **1400** directs the flow of execution from starting operation **1222** to operation **1402**. Operation **1402** performs reviewing the proposed embedded prescription refill. Arrow **1404** directs execution from operation **1402** to operation **1406**. Operation **1406** terminates the operations of this flowchart.

Figure **35** depicts a flowchart of further details of operation **1402** of Figure **34**.

15 Arrow **1420** directs the flow of execution from starting operation **1402** to operation **1422**. Operation **1422** performs approving the proposed prescription refill. Arrow **1424** directs execution from operation **1422** to operation **1426**. Operation **1426** terminates the operations of this flowchart.

Arrow **1430** directs the flow of execution from starting operation **1402** to
20 operation **1432**. Operation **1432** performs revising the proposed embedded prescription refill. Arrow **1434** directs execution from operation **1432** to operation **1426**. Operation **1426** terminates the operations of this flowchart.

Arrow **1440** directs the flow of execution from starting operation **1402** to operation **1442**. Operation **1442** performs deleting the proposed embedded

prescription refill. Arrow **1444** directs execution from operation **1442** to operation **1426**. Operation **1426** terminates the operations of this flowchart.

Arrow **1450** directs the flow of execution from starting operation **1402** to operation **1452**. Operation **1452** performs generating a second embedded prescription. Arrow **1454** directs execution from operation **1452** to operation **1426**. Operation **1426** terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a branching mechanism. Such a mechanism can be driven by patient choices via a user interface, such as buttons or pull down menus being selected or pushed.

Figure **36** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments supporting billing patients. Operation **1470** starts the operations of this flowchart. Arrow **1472** directs the flow of execution from operation **1470** to operation **1474**. Operation **1474** performs generating a billing report from the patient medical profile. Arrow **1476** directs execution from operation **1474** to operation **1478**. Operation **1478** terminates the operations of this flowchart.

Figure **37** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments further supporting billing patients. Operation **1490** starts the operations of this flowchart. Arrow **1492** directs the flow of execution from operation **1490** to operation **1494**. Operation **1494** performs sending the billing report to the billing system. Arrow **1496** directs execution from operation **1494** to operation **1498**. Operation **1498** terminates the operations of this flowchart.

- Figure 38 depicts a flowchart of further operations embodying a billing process in accordance with certain embodiments. Operation 1510 starts the operations of this flowchart. Arrow 1512 directs the flow of execution from operation 1510 to operation 1514. Operation 1514 performs receiving the 5 billing report for the patient. Arrow 1516 directs execution from operation 1514 to operation 1518. Operation 1518 performs generating a bill for the patient based from the received billing report for the patient. Arrow 1520 directs execution from operation 1518 to operation 1522. Operation 1522 terminates the operations of this flowchart. ###
- 10 Figure 39 depicts a flowchart of further details of operation 1518 of Figure 38. Arrow 1540 directs the flow of execution from starting operation 1518 to operation 1542. Operation 1542 performs generating a personal bill for the patient. Arrow 1544 directs execution from operation 1542 to operation 1546. Operation 1546 terminates the operations of this flowchart.
- 15 Arrow 1550 directs the flow of execution from starting operation 1518 to operation 1552. Operation 1552 performs generating an insurance bill for the patient to corresponding insurance provider. Arrow 1554 directs execution from operation 1552 to operation 1546. Operation 1546 terminates the operations of this flowchart.
- 20 Note that a patient may not have insurance, so that in such circumstances, no insurance bills would be generated. Note also, that in certain circumstances, there may be an overall insuring, such as a governmental agency, fully paying for the health costs. In such circumstances, no personal medical bill might be generated. In certain alternative embodiments, the performing of these 25 operations might not lead to output of one or the other kinds of medical bills.

Figure 40 depicts a flowchart of further details of operation 708 of Figure 8 supporting a physician requesting a second opinion in accordance with certain embodiments. Arrow 1570 directs the flow of execution from starting operation 704 to operation 1572. Operation 1572 performs generating a first-physician-second opinion request message. Arrow 1574 directs execution from operation 1572 to operation 1576. Operation 1576 performs sending the first-physician-second opinion request message to the second physician at the corresponding physician address. Arrow 1578 directs execution from operation 1576 to operation 1580. Operation 1580 terminates the operations of this flowchart.

Figure 41 depicts a flowchart of operations embodied in the second message wizard supporting a second physician and a second opinion request in accordance with certain embodiments. Operation 1600 starts the operations of this flowchart. Arrow 1602 directs the flow of execution from operation 1600 to operation 1604. Operation 1604 performs receiving the first-physician-second opinion request message. Arrow 1606 directs execution from operation 1604 to operation 1608. Operation 1608 performs processing the received, first-physician-second opinion request message to create the processed, received first-physician-second opinion request. Arrow 1610 directs execution from operation 1608 to operation 1612. Operation 1612 performs displaying the processed, received first-physician-second-opinion request. Arrow 1614 directs execution from operation 1612 to operation 1616. Operation 1616 performs responding to the displayed, processed, received first-physician-second opinion request to create a second opinion response. Arrow 1618 directs execution from operation 1616 to operation 1620. Operation 1620 performs generating a second opinion message from

the second opinion response. Arrow **1622** directs execution from operation **1620** to operation **1624**. Operation **1624** performs sending the second opinion message to the first-physician at the corresponding physician address. Arrow **1626** directs execution from operation **1624** to operation **1628**. Operation **1628** terminates the operations of this flowchart.

Figure **42** depicts a flowchart of operations embodied in a second message wizard supporting maintaining a collection of patient response templates in accordance with certain embodiments. Operation **1640** starts the operations of this flowchart. Arrow **1642** directs the flow of execution from operation **1640** to operation **1644**. Operation **1644** performs creating a patient response template. Arrow **1646** directs execution from operation **1644** to operation **1648**. Operation **1648** terminates the operations of this flowchart.

Arrow **1650** directs the flow of execution from starting operation **1640** to operation **1652**. Operation **1652** performs editing one of the patient response templates. Arrow **1654** directs execution from operation **1652** to operation **1648**. Operation **1648** terminates the operations of this flowchart.

Arrow **1660** directs the flow of execution from starting operation **1640** to operation **1662**. Operation **1662** performs deleting one of the patient response templates. Arrow **1664** directs execution from operation **1662** to operation **1648**. Operation **1648** terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a branching mechanism. Such a mechanism can be driven by patient choices via a user interface, such as buttons or pull down menus being selected or pushed.

Figure 43 depicts a flowchart of further details of operation 704 of Figure 8 supporting use of a patient response template to create a first-physician response in accordance with certain embodiments. Arrow 1670 directs the flow of execution from starting operation 704 to operation 1672. Operation 5 1672 performs invoking one of the patient response templates in conjunction with the processed, received patient medical query message. Arrow 1674 directs execution from operation 1672 to operation 1676. Operation 1676 performs responding by first physician to invoked patient response template and processed, received patient medical query message to create the first- 10 physician response. Arrow 1678 directs execution from operation 1676 to operation 1680. Operation 1680 terminates the operations of this flowchart.

Figure 44 depicts a flowchart of operations embodied in a first messaging wizard to support maintaining a collection of patient problem templates in accordance with certain embodiments. Operation 1700 starts the operations 15 of this flowchart. Arrow 1702 directs the flow of execution from operation 1700 to operation 1704. Operation 1704 performs receiving the patient problem template from workflow engine. Arrow 1706 directs execution from operation 1704 to operation 1708. Operation 1708 performs processing the received patient problem template to create a processed, received patient problem template. Arrow 1710 directs execution from operation 1708 to operation 20 1712. Operation 1712 performs adding the processed, received patient problem template to the collection of patient problem templates. Arrow 1714 directs execution from operation 1712 to operation 1716. Operation 1716 terminates the operations of this flowchart.

Figure 45 depicts a flowchart of further details of operation 604 of Figure 5 supporting use of a patient problem template to create an educated medical query using a first medical wizard in accordance with certain embodiments. Arrow 1730 directs the flow of execution from starting operation 604 to operation 1732. Operation 1732 performs invoking one of the patient problem templates. Arrow 1734 directs execution from operation 1732 to operation 1736. Operation 1736 performs responding by patient to invoked patient problem templates to create the educated query message. Arrow 1738 directs execution from operation 1736 to operation 1740. Operation 1740 terminates the operations of this flowchart.

Figure 46 depicts a flowchart of operations embodied in a medical profiler process performed by a workflow engine to generate and send patient problem templates to patients in accordance with certain embodiments. Operation 1760 starts the operations of this flowchart. Arrow 1762 directs the flow of execution from operation 1760 to operation 1764. Operation 1764 performs generating a patient problem template from the patient medical profile. Arrow 1766 directs execution from operation 1764 to operation 1768. Operation 1768 performs sending the patient problem template to the patient at the corresponding patient address. Arrow 1770 directs execution from operation 1768 to operation 1772. Operation 1772 terminates the operations of this flowchart.

Figure 47 depicts a flow diagram of a medical profiler process in accordance with certain embodiments. Box 1800 designates a Medical Profiler Process Dispatcher. This communicates via physical transport mechanism 1802 to network 1804. Box 1808 designates Medical profiler sub-process 1 on

workflow engine 1, performing the operation **630** of Figure **6**. This communicates via physical transport mechanism **1806** to network **1804**. Box **1812** designates Medical profiler sub-process 2 on workflow engine 2, performing the operation **740** of Figure **9**. This communicates via physical
5 transport mechanism **1810** to network **1804**. Box **1816** designates Medical profiler sub-process 3 on workflow engine 3, performing the operation **1040** of Figure **21**. This communicates via physical transport mechanism **1814** to network **1804**. Box **1820** designates Medical profiler sub-process 4 on workflow engine 4, performing the operation **1270** of Figure **28**. This
10 communicates via physical transport mechanism **1818** to network **1804**. Box **1824** designates Medical profiler sub-process 5 on workflow engine 5, performing the operation **1470** of Figure **36**. This communicates via physical transport mechanism **1822** to network **1804**. Box **1828** designates Medical profiler sub-process 6 on workflow engine 6, performing the operation **1490** of
15 Figure **37**. This communicates via physical transport mechanism **1826** to network **1804**. Box **1832** designates Medical profiler sub-process 7 on workflow engine 7, performing the operation **1760** of Figure **46**. This communicates via physical transport mechanism **1830** to network **1804**.

Note that in certain alternative embodiments, collections of these sub-
20 processes may preferably reside on a single workflow engine. Note that in certain other embodiments, multiple workflow engines may be performing a given sub-process.

Figure **48** depicts a flow diagram of a computer program capable of receiving a message from a physician containing a prescription and responding to the
25 message containing the prescription in accordance with an aspect of the

invention. Operation **1850** starts the operations of this flowchart. Arrow **1852** directs the flow of execution from operation **1850** to operation **1854**. Operation **1854** performs receiving the patient message with an embedded prescription. Arrow **1856** directs execution from operation **1854** to operation **1858**. Operation **1858** performs displaying the received patient message with embedded prescription. Arrow **1860** directs execution from operation **1858** to operation **1862**. Operation **1862** performs responding to the patient message with embedded prescription. Arrow **1864** directs execution from operation **1862** to operation **1866**. Operation **1866** terminates the operations of this flowchart.

Figure **49** depicts a flowchart of further details of the code of **1854** of Figure **48** supporting receiving a patient message with an embedded prescription in accordance with certain embodiments. Arrow **1880** directs the flow of execution from starting operation **1854** to operation **1882**. Operation **1882** performs receiving an encrypted patient message with embedded prescription. Arrow **1884** directs execution from operation **1882** to operation **1886**. Operation **1886** performs processing the received, encrypted patient message with embedded prescription to create the received patient message with embedded prescription. Arrow **1888** directs execution from operation **1886** to operation **1890**. Operation **1890** terminates the operations of this flowchart.

Figure **50** depicts a flowchart of further details of the code of **1862** of Figure **48** supporting responding to the patient response message in accordance with certain embodiments. Arrow **1900** directs the flow of execution from starting operation **1862** to operation **1902**. Operation **1902** performs

generating a patient prescription message from said embedded prescription. Arrow **1904** directs execution from operation **1902** to operation **1906**. Operation **1906** performs sending said patient prescription message to said workflow engine. Arrow **1908** directs execution from operation **1906** to 5 operation **1910**. Operation **1910** terminates the operations of this flowchart.

Figure **50A** depicts a flowchart of further details of **1311** of Figure 30 supporting integrating a prescription order in accordance with certain embodiments.

Arrow **1920** directs the flow of execution from starting operation **1311** to 10 operation **1922**. Operation **1922** determines if the received patient response message contains an embedded prescription. Arrow **1924** directs execution from operation **1922** to operation **1926**. Arrow **1924** directs execution when the determination is ‘Yes’ to operation **1926**. Arrow **1954** directs execution when the determination is ‘No’ to operation **1946**.

15 Operation **1926** performs receiving the patient prescription order message from the first patient. Arrow **1928** directs execution from operation **1926** to operation **1930**. Operation **1930** determines if the patient prescription order message from the first patient is compatible with the embedded prescription contained in the received patient response message. Arrow **1932** directs 20 execution from operation **1930** to operation **1934**. Arrow **1932** directs execution when the determination is ‘Yes’ to operation **1934**. Arrow **1956** directs execution when the determination is ‘No’ to operation **1946**.

Operation **1934** determines if the patient prescription order received from the first patient authorizes the prescription order. Arrow **1936** directs execution

from operation **1934** to operation **1938**. Arrow **1936** directs execution when the determination is ‘Yes’ to operation **1938**. Arrow **1958** directs execution when the determination is ‘No’ to operation **1946**.

Operation **1938** determines a first pharmacy from the patient prescription

5 order. Arrow **1940** directs execution from operation **1938** to operation **1942**.

Operation **1942** performs generates and sends the prescription order message to the first pharmacy based upon the received patient response message and the received patient prescription order message. Arrow **1944** directs execution from operation **1942** to operation **1946**. Operation **1946**

10 terminates the operations of this flowchart.

Figure **50B** depicts a flowchart of further details of **1324** of Figure **30A** supporting generating a pharmacy prescription order in accordance with certain embodiments.

Arrow **1960** directs the flow of execution from starting operation **1324** to

15 operation **1962**. Operation **1962** determines if the processed, received patient prescription order is compatible with the processed, received physician prescription. Arrow **1964** directs execution when the determination is ‘Yes’ to operation **1966**. Arrow **1978** directs usage when the determination is ‘No’ to operation **1970**.

20 Operation **1966** generates a pharmacy prescription order message from the processed, received physician prescription message and the processed, received patient prescription order. Arrow **1968** directs execution from operation **1966** to operation **1970**. Operation **1970** terminates the operations of this flowchart.

Figure 50C depicts a flowchart of further details of 1326 of Figure 30A supporting sending a pharmacy prescription order to a pharmacy in accordance with certain embodiments.

Arrow 1980 directs the flow of execution from starting operation 1326 to operation 1962. Operation 1962 determines if the processed, received patient prescription order is compatible with the processed, received physician prescription. Arrow 1984 directs execution from operation 1962 to operation 1986. Arrow 1984 directs execution when the determination is ‘Yes’ to operation 1986. Arrow 1998 directs usage when the determination is ‘No’ to operation 1994.

Operation 1986 performs determine the first pharmacy from the processed, received patient prescription order. Arrow 1988 directs execution from operation 1986 to operation 1990. Operation 1990 performs sending the pharmacy prescription order message to the first pharmacy. Arrow 1992 directs execution from operation 1990 to operation 1994. Operation 1994 terminates the operations of this flowchart.

Figure 50D depicts a flowchart of further details of 1106 of Figure 23 supporting determining a routing chain of physician extenders and embedding the routing chain into a second patient query in accordance with certain embodiments.

Arrow 2010 directs the flow of execution from starting operation 1106 to operation 2012. Operation 2012 determines a routing chain of physician extenders. Arrow 2014 directs execution from operation 2012 to operation 2016. Operation 2016 embeds the routing chain of physician extenders into

the second medical query. Arrow **2018** directs execution from operation **2016** to operation **2020**. Operation **2020** terminates the operations of this flowchart.

Note that a routing chain of physician extenders is a collection of at least one physician extender to whom the second patient query will be routed after the
5 first physician extender has added their proposed response to the patient query.

Figure **50E** depicts a flowchart of further details of **1178** of Figure **24** supporting determining successor physician extenders in an embedded physician extender routing chain, generating a successor medical query
10 message with embedded proposed patient response and sending the successor patient medical query to the successor physician extender.

Arrow **2030** directs the flow of execution from starting operation **1178** to operation **2032**. Operation **2032** determines if there is a successor physician extender in the embedded physician extender chain. Arrow **2034** directs
15 execution from operation **2032** to operation **2036**. Arrow **2034** directs execution when the determination is ‘Yes’ to operation **2032**. Arrow **2048** directs execution when the determination is ‘No’ to operation **2044**.

Operation **2036** generates the successor medical query message with the embedded proposed patient response. Arrow **2038** directs execution from
20 operation **2036** to operation **2040**. Operation **2040** send the successor patient medical query to the successor physician extender. Arrow **2042** directs execution from operation **2040** to operation **2044**. Operation **2044** terminates the operations of this flowchart.

Figure 50F depicts a flowchart of further details of 646 of Figure 6 supporting generating a routing tree of physicians with first physician final destination and source list of physicians, generating and sending a source medical query to each physician included in the physician source list.

- 5 Arrow 2060 directs the flow of execution from starting operation 646 to operation 2062. Operation 2062 performs generating a routing tree of physicians with the first physician the final destination of the routing tree and a source list of physicians of the routing tree. Arrow 2064 directs execution from operation 2062 to operation 2066. Operation 2066 performs generating
- 10 and sending a source medical query for and to each physician belonging to the source list of the routing tree. Arrow 2068 directs execution from operation 2066 to operation 2070. Operation 2070 terminates the operations of this flowchart.

Additional Discussion of Primary Terms as used herein:

- 15 A service profile of a client is a collection of information residing in some computer accessible media which from time to time a computer may be able to access.

- The service profiler process is the system-wide activities which are performed in an automated fashion by the service-flow engine to facilitate the service
- 20 communication between clients, service providers, service extenders and suppliers to support at least the following: service queries, replies and transactions involved in service recommendations.

The service-flow engine is the mechanism performing the collection of operations known as the service profiler process. It has at least one address

on the network shared with clients, service providers, service extenders and suppliers. Note that this shared network may in fact be partitioned into a collection of networks, each possessing gateways, firewalls and the like as is well known in the art. Note that the service-flow engine may include but is not limited to one computer, and in fact, in certain embodiments preferably involves more than one server computer as will be discussed later.

A client as used herein will have two components of meaning: The first component being the entity about whom the service profile, query messages, response message and service recommendations are directed; the second is a responsible individual acting for the client in all the transactions, such as generating the query messages, receiving and considering the response messages and ordering the service recommendations. Note that a list of the first component entities includes but is not limited to people, corporations, companies, organizations, as well as real estate, machinery including but not limited to automobiles, computer systems, web sites, software, telephones, communications networks and systems.

Further embodiments of the invention support the service-flow engine creating routing chains of service extenders starting with a first service extender proceeding through successor service provider extenders until the routing chain terminates with a service provider reviewing the collective proposed client response. The routing chain may be generated by the service-flow engine based upon the client's educated query message.

Further embodiments of the invention support the service-flow engine creating routing trees of service providers with patent query messages starting with a source list of service providers, possibly routing to intermediate service

providers and culminating in a first service provider who reviews the collective service provider responses to their respective client service queries.

Figure 51 depicts a flow diagram of an embodiment of the invention in accordance with certain embodiments. Client 2200 is the primary initiator of

5 this invention. Arrow 2202 depicts the interactions of client 2200 to create the educated query message 2204. The educated query message 2204 is an optimized service query directed by the client to address concerns and conditions involving the client. Arrow 2206 depicts the sending of educated

10 query message 2204 to the service profile 2208 which is managed by the service profiler process. The service-flow engine performs the various service profiler process operations. More will be said about the service-flow engine shortly. Arrow 2210 depicts interactive communication between the service-

15 flow engine 2208 and the service providers 2212 primarily regarding the service profiler. Service providers 2212 are the central destination of client generated educated service query messages as sent by 2210 from the service profiler process to the service provider 2212. Arrow 2214 depicts the response of service provider 2212 to the educated query message, generating a consultative response 2216. Consultation 2216 provides the basis of the client response message 2226. Arrow 2218 depicts the inclusion

20 of the service provider consultative response 2216 with educational material 2220. Educational material 2220 is included in certain, but not all cases, to meet mandated regulations as well as provide the service providers a mechanism to distribute standard material regarding various conditions and treatments. Arrow 2222 depicts the service-flow engine activities required to

25 incorporate the consultative response and included materials 2220 with billing information (charging) 2224. Charging 2224 performs tasks of notifying a

client service profile of the consultative transaction, what was the query, response, educational materials included and the service expenses. Arrow 2226 depicts the actual patent response message derived from 2224 query, service provider response, educational materials included and the service expenses sent to client 2200.

Arrow 2230 depicts the message information flow from the service-flow engine to service extender 2232. Service extenders 2232 perform a number of service tasks under the direction of service providers 2212. Arrow 2234 depicts the sending of proposed client response messages generated by 10 service extenders 2232 to a service provider 2212. Arrow 2240 depicts another message information flow from the service-flow engine to a service assistant 2242. While service assistants are service extenders, a service assistant 2242 performs a specific additional task distinguishing them from other service extenders, such as service provider assistants and 15 administrators. Service assistant 2242 can propose service recommendation refills for example. Arrow 2244 depicts the sending of proposed client response message, which may further include proposed embedded service recommendation refills, from service assistant 2242 to service provider 2246.

Service provider 2212 performs a review on the proposed client response 20 messages from service extenders, including service assistants, as delivered by arrows 2234 and 2244. Template replies 2246 offer the capability for service providers to optimize the quality and efficiency of response in making many standard replies. Arrow 2248 depicts the interaction between template replies 2246 and service provider 2212.

PCT/US2014/037207

Arrow **2250** depicts the information and activity flow based upon the consultative response **2216** and the placing of a service recommendation message **2252**. Service recommendation message **2252** is created based upon the service provider's consultative response **2216**, which in turn is based
5 upon the client's service query message and possibly a service assistant's proposed service recommendation refill. Arrow **2254** depicts sending a service recommendation message **2252** to ordering process **2256**. Client **2200** receives the patent response message **2226**, and may respond by ordering the embedded service recommendation, which is depicted by arrow
10 **2264** indicating a client service recommendation message sent to ordering process **2256**. Ordering process **2256** waits until both the service provider service recommendation message **2254** and client service recommendation message **2264** have been received and processed before the order **2258** is actually placed with supplier **2260**. Supplier **2260** sends the service
15 recommendation to client **2300** as indicated by arrow **2362**.

Figure 52 depicts an interactive flow between a client using a first message interface, service-flow engine performing a service profiler process and service provider using a second message interface in accordance with an embodiment of the invention. Client **2300** interacts **2302** with client operated computer **2304**, which can access **2306** and perform the operations of first message interface **2308**. Service provider **2350** interacts **2352** with service provider operated computer **2354**, which can access **2356** and perform the operations of second message interface **2358**. Service extender **2400** interacts **2402** with service extender operated computer **2404**, which can
20 access **2406** and perform the operations of second message interface **2408**.
25

Client **2300** using first message interface **2308** on client operated computer **2304** generates **2310** educated query message **2312** and sends it **2314** to service-flow engine **2320** where it is received by service profiler process **2322**.

Service profiler process **2322** generates **2324** client message log entry **2326**,

- 5 which is added **2328** to the client service profile **2330**. Service profiler process **2322** further generates **2340** client service query message **2342**, which is sent **2344** to service provider operated computer **2354**.

Service provider **2350** using second message interface **2358** on service provider operated computer **2354** receives and responds to the client service

- 10 query message **2342**, generating **2360** a client response message **2362**, which in certain embodiments is sent **2364** directly to the client operated computer **2304**. In certain alternative embodiments, client response message **2362** is sent **2370** to the service-flow engine, where the service profiler process **2322** then sends **2372** a version to the client operated computer **2304**.
- 15 Service provider **2350** using second message interface **2358** on service provider operated computer **2354** further responds to the client service query message **2342**, generating a client response message with appended service provider billing data **2382**, which is sent **2384** to the service-flow engine, where the service profiler process **2322** then generates
- 20 **2390** a client response log entry **2392** which is added **2394** to the client service profile **2330**.

In certain situations, a service recommendation is embedded into client response message **2362** by the service provider **2350** using second message interface **2358** on service provider operated computer **2354** in response to the

- 25 client service query message **2342**, which is embedded into the client response

message **2362**. Service provider **2350** using second message interface **2358** on service provider operated computer **2354** also generates **2480** service provider service recommendation message **2482**, which is sent **2484** to the service-flow engine using the service profiler process **2322**. Client **2300** using
5 first message interface **2308** on client operated computer **2304** generates **2490** client order message **2492** and sends it **2494** to service-flow engine **2320** where it is received by service profiler process **2322**. Once both service provider service recommendation message **2482** and client order message **2492** have been received and authenticated, the medial profiler process **2322**
10 generates **2500** a supplier service order message **2502** which is sent **2504** to the supplier computer **2506**.

Service profiler process **2322** accesses **2510** the client service profile **2330** to generate **2512** client billing report message **2514** which is sent **2516** to billing system **2518**. Note that the billing system **2518** in certain embodiments is a
15 separate system element external to the service-flow engine. In certain alternative embodiments, billing system **2518** resides within the operations performed by the service-flow engine. In certain further embodiments, billing system **2518** is part of the service profiler process.

Note that in the flowcharts included herein, the starting operation of a
20 flowchart may perform operations to allocate systems resources for use by the subsequent operations of the flowchart in certain embodiments. The starting operation of a flowchart may further perform initialize systems resources in certain embodiments.

Note also that in the flowcharts included herein, the terminating or exit
25 operation of a flowchart may perform operations to release allocated systems

resources used by the subsequent operations of the flowchart in certain embodiments. The terminating operation of a flowchart may further perform a “return” operation in certain embodiments. Alternatively, the terminating operation of a flowchart may not perform a “return” operation in certain
5 embodiments.

Figure 52A depicts an interactive flow between a client using a first message interface, service-flow engine performing a service profiler process and service provider using a second message interface in accordance with a further embodiment of the invention. Client 2300 interacts 2302 with client
10 operated computer 2304, which can access 2306 and perform the operations of first message interface 2308. Service provider 2350 interacts 2352 with service provider operated computer 2354, which can access 2356 and perform the operations of second message interface 2358. Service extender 2400 interacts 2402 with service extender operated computer 2404, which
15 can access 2406 and perform the operations of second message interface 2408.

Client 2300 using first message interface 2308 on client operated computer 2304 generates 2310 educated query message 2312 and sends it 2314 to service-flow engine 2320 where it is received by service profiler process 2322.
20 Service profiler process 2322 generates 2324 client message log entry 2326, which is added 2328 to the client service profile 2330. Service profiler process 2322 further generates 2340 client service query message 2342, which is sent 2344 to service provider operated computer 2354.

Service provider 2350 using second message interface 2358 on service provider operated computer 2354 receives and responds to the client service
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query message **2342**, generating **2360** a client response message **2362**, which in certain embodiments is sent **2364** directly to the client operated computer **2304**. In certain alternative embodiments, client response message **2362** is sent **2370** to the service-flow engine, where the service profiler process **2322** then sends **2372** a version to the client operated computer **2304**. Service provider **2350** using second message interface **2358** on service provider operated computer **2354** further responds to the client service query message **2342**, generating a client response message with appended service provider billing data **2382**, which is sent **2384** to the service-flow engine, where the service profiler process **2322** then generates **2390** a client response log entry **2392** which is added **2394** to the client service profile **2330**.

In certain situations, a service recommendation is embedded into client response message **2362** by the service provider **2350** using second message interface **2358** on service provider operated computer **2354** in response to the client service query message **2342**, which is embedded into the client response message **2362**. Service provider **2350** using second message interface **2358** on service provider operated computer **2354** also generates **2480** service provider service recommendation message **2482**, which is sent **2484** to the service-flow engine using the service profiler process **2322**. Client **2300** using first message interface **2308** on client operated computer **2304** generates **2490** client order message **2492** and sends it **2494** to service-flow engine **2320** where it is received by service profiler process **2322**. Once both service provider service recommendation message **2482** and client order message **2492** have been received and authenticated, the medial profiler process **2322**

generates **2500** a supplier service order message **2502** which is sent **2504** to the supplier computer **2506**.

Service profiler process **2322** accesses **2510** the client service profile **2330** to generate **2512** client billing report message **2514** which is sent **2516** to billing

5 system **2518**. Note that the billing system **2518** in certain embodiments is a separate system element external to the service-flow engine. In certain alternative embodiments, billing system **2518** resides within the operations performed by the service-flow engine. In certain further embodiments, billing system **2518** is part of the service profiler process.

10 Service profiler process **2322** further generates **2400** a second client service query message **2402**, which is sent **2404** to service extender operated computer **2414**. Service extender **2410** using third message interface **2418** on service provider operated computer **2414** receives and responds to the second client service query message **2412**, generating **2430** a proposed client response message **2432**, which is sent **2434** directly to the service provider operated computer **2354**, where it is inserted into the client service query message **2342**. In certain alternative embodiments, client response message **2432** is sent **2436** to the service-flow engine, where the service profiler process **2322** then sends a version to the service provider operated computer
15 **2354**. Service extender **2410** using third message interface **2418** on service provider operated computer **2414** further responds **2440** to the second client service query message **2402**, generating a proposed client response message with appended service extender billing data **2442**, which is sent **2444** to the service-flow engine, where the service profiler process **2322** then
20 generates **2450** a proposed client response with appended service extender
25

billing data log entry **2452** which is added **2454** to the client service profile **2330**.

Figure **53** depicts a flowchart of operations supporting the generation and sending of an educated query by a client using the first message interface in accordance with embodiments supporting Figure **52**. Operation **2600** starts the operations of this flowchart. Arrow **2602** directs the flow of execution from operation **2600** to operation **2604**. Operation **2604** performs generating of an educated query message. Arrow **2606** directs execution from operation **2604** to operation **2608**. Operation **2608** performs sending the educated query message to the service-flow engine. Arrow **2610** directs execution from operation **2608** to operation **2612**. Operation **2612** terminates the operations of this flowchart.

Figure **54** depicts a flowchart of operations supporting the reception, processing, logging of the educated query message from the client, and the generation and sending of the client service query message to a service provider by the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure **52**. Operation **2630** starts the operations of this flowchart. Arrow **2632** directs the flow of execution from operation **2630** to operation **2634**. Operation **2634** performs receiving the educated query message at the service-flow engine. Arrow **2636** directs execution from operation **2634** to operation **2638**. Operation **2638** performs processing the received educated query message to create the processed, received educated query message. Arrow **2640** directs execution from operation **2638** to operation **2642**. Operation **2642** performs generating a client service query message. Arrow **2644** directs execution from operation

2642 to operation **2646**. Operation **2646** performs sending the client service query message to first service provider at corresponding service provider address. Arrow **2648** directs execution from operation **2646** to operation **2650**. Operation **2650** terminates the operations of this flowchart.

- 5 In certain embodiments, operation **646** further includes selecting a first service provider. In certain further embodiments, operation **646** further includes selecting a first service provider based upon the received educated query message. In certain further embodiments, operation **646** further includes selecting a first service provider based upon the processed, received educated query message.
- 10

Arrow **2652** directs the flow of execution from starting operation **2638** to operation **2654**. Operation **2654** performs generating a client message log entry in the client service profile. Arrow **2656** directs execution from operation **2654** to operation **2650**.

- 15 Figure 55 depicts a flowchart of operations supporting reception, processing and viewing the client service query message by the second message interface for the service provider in accordance with embodiments supporting Figure 52. Operation **2670** starts the operations of this flowchart. Arrow **2672** directs the flow of execution from operation **2670** to operation **2674**.
- 20 Operation **2674** performs receiving the client query message. Arrow **2676** directs execution from operation **2674** to operation **2678**. Operation **2678** performs processing the received client service query message to create the processed, received client service message. Arrow **2680** directs execution from operation **2678** to operation **2682**. Operation **2682** performs generating
- 25 a service-provider-viewable client service query message from the processed,

received client service query message. Arrow **2684** directs execution from operation **2682** to operation **2686**. Operation **2686** performs displaying the service-provider-viewable client service query message. Arrow **2688** directs execution from operation **2686** to operation **2690**. Operation **2690** terminates
5 the operations of this flowchart.

Figure **56** depicts a flowchart of operations supporting reception, generation and sending a client response message, as well as copying the client response message with an appended service provider billing data to the service-flow engine in accordance with embodiments supporting Figure **52**.

10 Operation **2700** starts the operations of this flowchart. Arrow **2702** directs the flow of execution from operation **2700** to operation **2704**. Operation **2704** performs responding to the service-provider-viewable client service query message to create a first-service-provider response. Arrow **2706** directs execution from operation **2704** to operation **2708**. Operation **2708** performs
15 generating a client response message from the first-service-provider response. Arrow **2710** directs execution from operation **2708** to operation **2712**. Operation **2712** performs sending the client response message to the client at the corresponding client address. Arrow **2714** directs execution from operation **2712** to operation **2716**. Operation **2716** terminates the operations
20 of this flowchart.

Arrow **2720** directs the flow of execution from starting operation **2708** to operation **2722**. Operation **2722** performs copying the client response message with appended service provider billing data to service-flow engine. Arrow **2724** directs execution from operation **2722** to operation **2716**.

Figure 57 depicts a flowchart of operations supporting the reception, processing, logging the copied client response message with an appended service provider billing data by the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure 52.

- 5 Operation **2740** starts the operations of this flowchart. Arrow **2742** directs the flow of execution from operation **2740** to operation **2744**. Operation **2744** performs receiving the copied client response message with appended service provider billing data. Arrow **2746** directs execution from operation **2744** to operation **2748**. Operation **2748** performs processing the received, copied client response message with appended service provider billing data to create the processed, received, copied client response message with appended service provider billing data. Arrow **2750** directs execution from operation **2748** to operation **2752**. Operation **2752** performs generating a client response log entry in client service profile from the processed, received, copied client response message with appended service provider billing data.
- 10 Arrow **2754** directs execution from operation **2752** to operation **2756**.
- 15 Operation **2756** terminates the operations of this flowchart.

- Figure 58 depicts a flowchart of operations supporting reception, processing and display of the client response message using the first message interface on the client operated computer in accordance with embodiments supporting Figure 52. Operation **2770** starts the operations of this flowchart. Arrow **2772** directs the flow of execution from operation **2770** to operation **2774**. Operation **2774** performs receiving the client response message. Arrow **2776** directs execution from operation **2774** to operation **2778**. Operation **2778** performs processing the received client response message, to create a processed, received client response message. Arrow **2780** directs execution
- 20
 - 25

from operation **2778** to operation **2782**. Operation **2782** performs displaying the processed, received client response message. Arrow **2784** directs execution from operation **2782** to operation **2786**. Operation **2786** terminates the operations of this flowchart.

- 5 Figure **59** depicts a flowchart of further details regarding operation **2604**, generation of an educated query message by the first message interface in accordance with embodiments supporting Figure **53**. Arrow **2800** directs the flow of execution from starting operation **2604** to operation **2802**. Operation **2802** performs providing a client-to-profiler authentication key. Arrow **2804**
10 directs execution from operation **2802** to operation **2806**. Operation **2806** performs encrypting the educated query message with client-to-profiler authentication key. Arrow **2808** directs execution from operation **2806** to operation **2810**. Operation **2810** terminates the operations of this flowchart.

Figure **60** depicts a flowchart of further details regarding operation **2638**,
15 processing the educated query message using the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure **54**. Arrow **2820** directs the flow of execution from starting operation **2638** to operation **2822**. Operation **2822** performs providing a profiler-from-client authentication key. Arrow **2824** directs execution from
20 operation **2822** to operation **2826**. Operation **2826** performs decrypting the received, educated query message with profiler-from-client authentication key. Arrow **2828** directs execution from operation **2826** to operation **2830**. Operation **2830** terminates the operations of this flowchart.

Figure **61** depicts a flowchart of further details regarding operation **2642**,
25 generation of a client service query message by the service profiler process

- performed by the service-flow engine in accordance with embodiments supporting Figure 54. Arrow 2850 directs the flow of execution from starting operation 2642 to operation 2852. Operation 2852 performs providing profiler-from-first-service-provider authentication key. Arrow 2854 directs 5 execution from operation 2852 to operation 2856. Operation 2856 performs encrypting client service query message with profiler-from-first-service-provider authentication key. Arrow 2858 directs execution from operation 2856 to operation 2860. Operation 2860 terminates the operations of this flowchart.
- 10 Figure 62 depicts a flowchart of further details regarding operation 2678, processing the received client service query message by the second message interface in accordance with embodiments supporting Figure 55. Arrow 2880 directs the flow of execution from starting operation 2678 to operation 2882. Operation 2882 performs providing a first-service-provider-from-profiler 15 authentication key. Arrow 2884 directs execution from operation 2882 to operation 2886. Operation 2886 performs decrypting the received client service query message with the first-service-provider-from-profiler authentication key. Arrow 2888 directs execution from operation 2886 to operation 2890. Operation 2890 terminates the operations of this flowchart.
- 20 Figure 63 depicts a flowchart of further details regarding operation 2722, copying the client response message with appended service provider billing data to the service-flow engine by the second message interface in accordance with embodiments supporting Figure 56. Arrow 2900 directs the flow of execution from starting operation 2722 to operation 2902. Operation 25 2902 performs providing a first-service-provider-to-profiler authentication key.

- Arrow **2904** directs execution from operation **2902** to operation **2906**. Operation **2906** performs encrypting the client response message with appended service provider billing data with the first-service-provider-to-profiler authentication key. Arrow **2908** directs execution from operation **2906** to 5 operation **2910**. Operation **2910** performs sending first-service-provider-to-profiler encrypted client response message with appended service provider billing data to the service-flow engine. Arrow **2912** directs execution from operation **2910** to operation **2914**. Operation **2914** terminates the operations of this flowchart.
- 10 Figure **64** depicts a flowchart of further details regarding operation **2748**, processing the received, copied the client response message with appended service provider billing data using the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure 57. Arrow **2930** directs the flow of execution from starting operation **2748** to 15 operation **2932**. Operation **2932** performs providing a profiler-from-first-service-provider authentication key. Arrow **2934** directs execution from operation **2932** to operation **2936**. Operation **2936** performs decrypting the received, copied client response message with appended service provider billing data with the profiler-from-first service provider authentication key to 20 create the processed, received client response message with appended service provider billing data. Arrow **2938** directs execution from operation **2936** to operation **2940**. Operation **2940** terminates the operations of this flowchart.

Figure **65** depicts a flowchart of further details regarding operation **2708**, 25 generating client response message using the second message interface in

accordance with embodiments supporting Figure 56. Arrow 2950 directs the flow of execution from starting operation 2708 to operation 2952. Operation 2952 performs providing first-service-provider-to-client authentication key. Arrow 2954 directs execution from operation 2952 to operation 2956.

5 Operation 2956 performs generating an unencrypted client response message from the service-provider-viewable client service query message and the first-service-provider response. Arrow 2958 directs execution from operation 2956 to operation 2960. Operation 2960 performs encrypt the unencrypted client response message with the first-service-provider-to-client

10 authentication key to create the client response message. Arrow 2962 directs execution from operation 2960 to operation 2964. Operation 2964 terminates the operations of this flowchart.

Note that operations 2952 and 2956 may be performed either in the order presented by this flowchart, or in certain alternative embodiments, in the
15 reverse order to that shown, or further alternatively, concurrently with each other.

Figure 66 depicts a flowchart of further details regarding operation 2778, processing the received client response message using the first message interface in accordance with embodiments supporting Figure 58. Arrow 2980 directs the flow of execution from starting operation 2778 to operation 2982. Operation 2982 performs providing a client-from-first-service-provider authentication key. Arrow 2984 directs execution from operation 2982 to operation 2986. Operation 2986 performs decrypting the received client response message with the client-from-first-service-provider authentication
20 key to create the processed, received client response message. Arrow 2988

directs execution from operation **2986** to operation **2990**. Operation **2990** terminates the operations of this flowchart.

Figure **67** depicts a flowchart of further details regarding operation **2712**, sending the client response message with appended service provider billing data using the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure **56**. Arrow **3000** directs the flow of execution from starting operation **2712** to operation **3002**. Operation **3002** performs sending client response message destined to client to service-flow engine. Arrow **3004** directs execution from operation **3002** to operation **3006**. Operation **3006** terminates the operations of this flowchart.

Figure **68** depicts a flowchart of further details regarding operation **2708**, generating the client response message using the second message interface in accordance with embodiments supporting Figure **56**. Arrow **3010** directs the flow of execution from starting operation **2708** to operation **3012**. Operation **3012** performs providing the first-service-provider-to-profiler authentication code. Arrow **3014** directs execution from operation **3012** to operation **3016**. Operation **3016** performs providing the client address as destination address within the client response message, to create an unencrypted client response message with client address destination. Arrow **3018** directs execution from operation **3016** to operation **3020**. Operation **3020** performs encrypting the unencrypted client response message with the first-service-provider-to-profiler authentication code to create the client response message destined for the client at the corresponding client address. Arrow **3022** directs execution from operation **3020** to operation **3024**. Operation **3024** terminates the operations of this flowchart.

Note that operations **3012** and **3016** in certain alternative embodiments may be performed in reverse order, and in certain further alternative embodiments, may be concurrently performed.

Figure **69** depicts a flowchart of operations of the service profiler process performed by the service-flow engine in accordance with alternative embodiments supporting Figure **52**. Operation **3040** starts the operations of this flowchart. Arrow **3042** directs the flow of execution from operation **3040** to operation **3044**. Operation **3044** performs receiving the client response message destined for the client at the corresponding client address. Arrow **3046** directs execution from operation **3044** to operation **3048**. Operation **3048** performs processing the received client response message destined for the client at the corresponding client address, to create the client response message for the client at the corresponding client address. Arrow **3050** directs execution from operation **3048** to operation **3052**. Operation **3052** performs sending the client response message to the client at the corresponding client address. Arrow **3054** directs execution from operation **3052** to operation **3056**. Operation **3056** terminates the operations of this flowchart.

Figure **70** depicts a flowchart of further details regarding operation **3048**, processing the client response message destined for the client using the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure **69**. Arrow **3070** directs the flow of execution from starting operation **3048** to operation **3072**. Operation **3072** performs providing a profiler-from-first-service-provider authentication key. Arrow **3074** directs execution from operation **3072** to operation **3076**.

Operation **3076** performs decrypting the received client response message destined for the client at the corresponding client address to create the processed, received client response message for the client at the corresponding client address. Arrow **3078** directs execution from operation **3076** to operation **3080**. Operation **3080** terminates the operations of this flowchart.

Figure **71** depicts a flowchart of further details regarding operation **2642**, generating a client service query message using the service profiler process performed by the service-flow engine in accordance with embodiments. Arrow

10 **3100** directs the flow of execution from starting operation **2642** to operation **3102**. Operation **3102** performs selecting a first service extender from the service extenders. Arrow **3104** directs execution from operation **3102** to operation **3106**. Operation **3106** performs generating a second client service query message for the first service extender. Arrow **3108** directs execution from operation **3106** to operation **3110**. Operation **3110** performs sending the second client service query message to the first service extender at the corresponding service extender address. Arrow **3112** directs execution from operation **3110** to operation **3114**. Operation **3114** terminates the operations of this flowchart.

20 Note that in certain embodiments, operation **3102** is based upon the received educated query message. In certain further embodiments, operation **3102** is based upon the processed, received educated query message.

Figure **72** depicts a flowchart of operations using the third message interface on the service extender computer in accordance with embodiments supporting Figure **57**. Operation **3150** starts the operations of this flowchart.

Arrow **3152** directs the flow of execution from operation **3150** to operation **3154**. Operation **3154** performs receiving a second client message by first service extender operating a computer at the corresponding service extender address. Arrow **3156** directs execution from operation **3154** to operation **3158**. Operation **3158** performs processing the received second client service query message to create a processed, received second client service query message. Arrow **3160** directs execution from operation **3158** to operation **3162**. Operation **3162** performs generating a service extender-viewable client service query message from the processed, received second client service query message. Arrow **3164** directs execution from operation **3162** to operation **3166**. Operation **3166** performs displaying the service extender-viewable service query message. Arrow **3168** directs execution from operation **3166** to operation **3170**. Operation **3170** performs responding to the service extender-viewable service query message to create a service extender response. Arrow **3172** directs execution from operation **3170** to operation **3174**. Operation **3174** performs generating the proposed client response message from service extender response. Arrow **3176** directs execution from operation **3174** to operation **3178**. Operation **3178** performs sending the proposed client response message to the first service provider at the corresponding service provider address. Arrow **3180** directs execution from operation **3178** to operation **3182**. Operation **3182** terminates the operations of this flowchart.

Figure **73** depicts a flowchart of further details regarding operation **2682**, generating the service-provider-viewable client service query message in accordance with embodiments supporting Figures **55**. Arrow **3200** directs the flow of execution from starting operation **2682** to operation **3202**. Operation

3202 performs receiving proposed client response message from first service extender. Arrow **3204** directs execution from operation **3202** to operation **3206**. Operation **3206** performs processing the received client response message to create processed, received client response message. Arrow 5 **3208** directs execution from operation **3206** to operation **3210**. Operation **3210** performs inserting the processed, received proposed client response message as part of the service-provider-viewable client service query message. Arrow **3212** directs execution from operation **3210** to operation **3214**. Operation **3214** terminates the operations of this flowchart.

- 10 Figure **74** depicts a flowchart of further details regarding operation **2708**, generating the client response message using the second message interface in accordance with certain embodiments. Arrow **3220** directs the flow of execution from starting operation **2708** to operation **3222**. Operation **3222** performs reviewing the proposed client response message. Arrow **3224** 15 directs execution from operation **3222** to operation **3226**. Operation **3226** terminates the operations of this flowchart.

Figure **75** depicts a flowchart of further operations embodying the third message interface in accordance with certain embodiments. Arrow **3240** directs the flow of execution from starting operation **3240** to operation **3242**. 20 Operation **3242** performs generating a copied proposed client response message with appended service extender billing data from the service extender-viewable client service query message and first service extender response. Arrow **3244** directs execution from operation **3242** to operation **3246**. Operation **3246** performs sending copied proposed client response 25 with appended service extender billing data to service-flow engine. Arrow

3248 directs execution from operation **3246** to operation **3250**. Operation **3250** terminates the operations of this flowchart.

Figure **76** depicts a flowchart of further operations embodied in the message profiler process in accordance with certain embodiments. Operation **3270**

5 starts the operations of this flowchart. Arrow **3272** directs the flow of execution from operation **3270** to operation **3274**. Operation **3274** performs receiving the copied proposed client response message with the appended service extender billing data. Arrow **3276** directs execution from operation

10 **3274** to operation **3278**. Operation **3278** performs processing the received copied proposed client response message with the appended service extender billing data, to create a processed, received copied proposed client

15 response message with the appended service extender billing data. Arrow **3280** directs execution from operation **3278** to operation **3282**. Operation **3282** performs generating a service extender log entry in the service profile of

the client from the processed, received copied client response message with the appended service extender billing data. Arrow **3284** directs execution from operation **3282** to operation **3286**. Operation **3286** terminates the operations of this flowchart.

Figure **77** depicts a flowchart of further operations embodied in a second

20 message interface in accordance with certain embodiments supporting service recommendations. Operation **3290** starts the operations of this flowchart. Arrow **3291** directs the flow of execution from operation **3290** to

operation **3292**. Operation **3292** performs generating an embedded service recommendation. Arrow **3293** directs execution from operation **3292** to

25 operation **3294**. Operation **3294** performs inserting the embedded service

recommendation into client response message. Arrow **3295** directs execution from operation **3294** to operation **3296**. Operation **3296** performs generating a service provider service recommendation message from the embedded service recommendation. Arrow **3297** directs execution from operation **3296** to operation **3298**. Operation **3298** performs sending the service provider service recommendation message to the service-flow engine. Arrow **3299** directs execution from operation **3298** to operation **3300**. Operation **3300** terminates the operations of this flowchart.

Figure **78** depicts a flowchart of further operations embodied in a service profiler in accordance with certain embodiments supporting service recommendations. Operation **3305** starts the operations of this flowchart. Arrow **3306** directs the flow of execution from operation **3305** to operation **3307**. Operation **3307** performs maintaining a list of suppliers, each with a corresponding supplier address. Arrow **3308** directs execution from operation **3307** to operation **3309**. Operation **3309** terminates the operations of this flowchart.

Arrow **3310** directs the flow of execution from starting operation **3305** to operation **3311**. Operation **3311** performs integrating a service order. Arrow **3312** directs execution from operation **3311** to operation **3309**. Operation **3309** terminates the operations of this flowchart.

Note that arrows **3306** and **3310** may be concurrently active, the supplier list may be undergoing maintenance operations and the integration of service orders may be performed concurrently on either the same computer or distinct computers according to various embodiments of the invention.

- Figure 78A depicts a flowchart of further details regarding operation 3311, integrating a service order in the service profiler process in accordance with embodiments supporting Figure 78. Arrow 3315 directs the flow of execution from the starting of operation 3311 to operation 3316. Operation 3316
- 5 performs receiving the service provider service recommendation message. Arrow 3317 directs execution from operation 3316 to operation 3318. Operation 3318 performs processing the received service provider service recommendation message, to create a processed, received service provider service recommendation message.
- 10 Arrow 3319 directs execution from operation 3311 to operation 3320. Operation 3320 performs receiving a client order message. Arrow 3321 directs execution from operation 3320 to operation 3322. Operation 3322 performs processing the received client order message to create a processed, received client order message.
- 15 Arrow 3323 directs execution from operation 3322 to operation 3324. Arrow 3330 directs execution from operation 3318 to operation 3324. Note that in certain embodiments, both arrows 3323 and 3330 must perform their flow of execution before operation 3324 can execute. Operation 3324 performs generating a supplier service order message from the processed, received
- 20 service provider service recommendation message and the processed, received client order message. Arrow 3325 directs execution from operation 3324 to operation 3326. Operation 3326 performs sending the supplier service order message to one of the suppliers at the corresponding supplier address. Arrow 3327 directs execution from operation 3326 to operation
- 25 3328. Operation 3328 terminates the operations of this flowchart.

Figure 79 depicts a flowchart of further operations embodied in the first message interface in accordance with certain embodiments supporting service recommendations. Operation 3340 starts the operations of this flowchart. Arrow 3342 directs the flow of execution from operation 3340 to 5 operation 3344. Operation 3344 performs responding to the embedded service recommendation within the processed, received client response message. Arrow 3346 directs execution from operation 3344 to operation 3348. Operation 3348 terminates the operations of this flowchart.

Arrow 3350 directs the flow of execution from starting operation 3340 to 10 operation 3352. Operation 3352 performs ordering the embedded service recommendation from the processed, received client response message. Arrow 3354 directs execution from operation 3352 to operation 3348. Operation 3348 terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a 15 branching mechanism. Such a mechanism can be driven by client choices via a user interface, such as buttons or pull down menus being selected or pushed.

Figure 80 depicts a flowchart of further details of operation 3352, ordering the 20 embedded service recommendation of Figure 79. Arrow 3360 directs the flow of execution from starting operation 3352 to operation 3362. Operation 3362 performs generating a client service recommendation message from the processed, received client response message. Arrow 3364 directs execution from operation 3362 to operation 3366. Operation 3366 performs sending the client service recommendation message to the service-flow engine. Arrow

3368 directs execution from operation **3366** to operation **3370**. Operation **3370** terminates the operations of this flowchart.

Figure **81** depicts a flowchart of further details of operation **3170** of Figure **73**.

Arrow **3380** directs the flow of execution from starting operation **3170** to operation **3382**. Operation **3382** performs generating a proposed embedded service recommendation refill in the proposed client response. Arrow **3384** directs execution from operation **3382** to operation **3386**. Operation **3386** terminates the operations of this flowchart.

Figure **82** depicts a flowchart of further details of operation **3222** of Figure **75**.

Arrow **3400** directs the flow of execution from starting operation **3222** to operation **3402**. Operation **3402** performs reviewing the proposed embedded service recommendation refill. Arrow **3404** directs execution from operation **3402** to operation **3406**. Operation **3406** terminates the operations of this flowchart.

Figure **83** depicts a flowchart of further details of operation **3402** of Figure **82**.

Arrow **3420** directs the flow of execution from starting operation **3402** to operation **3422**. Operation **3422** performs approving the proposed service recommendation refill. Arrow **3424** directs execution from operation **3422** to operation **3426**. Operation **3426** terminates the operations of this flowchart.

Arrow **3430** directs the flow of execution from starting operation **3402** to operation **3432**. Operation **3432** performs revising the proposed embedded service recommendation refill. Arrow **3434** directs execution from operation **3432** to operation **3426**. Operation **3426** terminates the operations of this flowchart.

Arrow **3440** directs the flow of execution from starting operation **3402** to operation **3442**. Operation **3442** performs deleting the proposed embedded service recommendation refill. Arrow **3444** directs execution from operation **3442** to operation **3426**. Operation **3426** terminates the operations of this flowchart.

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Arrow **3450** directs the flow of execution from starting operation **3402** to operation **3452**. Operation **3452** performs generating a second embedded service recommendation. Arrow **3454** directs execution from operation **3452** to operation **3426**. Operation **3426** terminates the operations of this flowchart.

10 Note that in certain embodiments, the starting operation may act as a branching mechanism. Such a mechanism can be driven by client choices via a user interface, such as buttons or pull down menus being selected or pushed.

15 Figure **84** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments supporting billing clients. Operation **3470** starts the operations of this flowchart. Arrow **3472** directs the flow of execution from operation **3470** to operation **3474**. Operation **3474** performs generating a billing report from the client service profile. Arrow **3476** directs execution from operation **3474** to operation **3478**.

20 Operation **3478** terminates the operations of this flowchart.

Figure **85** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments further supporting billing clients. Operation **3490** starts the operations of this flowchart. Arrow **3492** directs the flow of execution from operation **3490** to operation **3494**.

Operation **3494** performs sending the billing report to the billing system.

Arrow **3496** directs execution from operation **3494** to operation **3498**.

Operation **3498** terminates the operations of this flowchart.

Figure **86** depicts a flowchart of further operations embodying a billing

5 process in accordance with certain embodiments. Operation **3510** starts the operations of this flowchart. Arrow **3512** directs the flow of execution from operation **3510** to operation **3514**. Operation **3514** performs receiving the billing report for the client. Arrow **3516** directs execution from operation **3514** to operation **3518**. Operation **3518** performs generating a bill for the client
10 based from the received billing report for the client. Arrow **3520** directs execution from operation **3518** to operation **3522**. Operation **3522** terminates the operations of this flowchart.

Figure **87** depicts a flowchart of further details of operation **3518** of Figure **86**.

Arrow **3540** directs the flow of execution from starting operation **3518** to

15 operation **3542**. Operation **3542** performs generating a personal bill for the client. Arrow **3544** directs execution from operation **3542** to operation **3546**.

Operation **3546** terminates the operations of this flowchart.

Arrow **3550** directs the flow of execution from starting operation **3518** to

operation **3552**. Operation **3552** performs generating an insurance bill for the

20 client to corresponding insurance provider. Arrow **3554** directs execution from operation **3552** to operation **3546**. Operation **3546** terminates the operations of this flowchart.

Note that a client may not have insurance, so that in such circumstances, no insurance bills would be generated. Note also, that in certain circumstances,

there may be an overall insuring, such as a governmental agency, fully paying for the health costs. In such circumstances, no personal service bill might be generated. In certain alternative embodiments, the performing of these operations might not lead to output of one or the other kinds of service bills.

- 5 Figure 88 depicts a flowchart of further details of operation **2704** of Figure 56 supporting a service provider requesting a second opinion in accordance with certain embodiments. Arrow **3570** directs the flow of execution from starting operation **2704** to operation **3572**. Operation **3572** performs generating a first-service-provider-second opinion request message. Arrow **3574** directs execution from operation **3572** to operation **3576**. Operation **3576** performs sending the first-service-provider-second opinion request message to the second service provider at the corresponding service provider address. Arrow **3578** directs execution from operation **3576** to operation **3580**. Operation **3580** terminates the operations of this flowchart.
- 10 15 Figure 89 depicts a flowchart of operations embodied in the second message interface supporting a second service provider and a second opinion request in accordance with certain embodiments. Operation **3600** starts the operations of this flowchart. Arrow **3602** directs the flow of execution from operation **3600** to operation **3604**. Operation **3604** performs receiving the first-service-provider-second opinion request message. Arrow **3606** directs execution from operation **3604** to operation **3608**. Operation **3608** performs processing the received, first-service-provider-second opinion request message to create the processed, received first-service-provider-second opinion request. Arrow **3610** directs execution from operation **3608** to operation **3612**. Operation **3612** performs displaying the processed, received
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first-service-provider-second-opinion request. Arrow **3614** directs execution from operation **3612** to operation **3616**. Operation **3616** performs responding to the displayed, processed, received first-service-provider-second opinion request to create a second opinion response. Arrow **3618** directs execution 5 from operation **3616** to operation **3620**. Operation **3620** performs generating a second opinion message from the second opinion response. Arrow **3622** directs execution from operation **3620** to operation **3624**. Operation **3624** performs sending the second opinion message to the first-service-provider at the corresponding service provider address. Arrow **3626** directs execution 10 from operation **3624** to operation **3628**. Operation **3628** terminates the operations of this flowchart.

Figure **90** depicts a flowchart of operations embodied in a second message interface supporting maintaining a collection of client response templates in accordance with certain embodiments. Operation **3640** starts the operations 15 of this flowchart. Arrow **3642** directs the flow of execution from operation **3640** to operation **3644**. Operation **3644** performs creating a client response template. Arrow **3646** directs execution from operation **3644** to operation **3648**. Operation **3648** terminates the operations of this flowchart.

Arrow **3650** directs the flow of execution from starting operation **3640** to 20 operation **3652**. Operation **3652** performs editing one of the client response templates. Arrow **3654** directs execution from operation **3652** to operation **3648**. Operation **3648** terminates the operations of this flowchart.

Arrow **3660** directs the flow of execution from starting operation **3640** to 25 operation **3662**. Operation **3662** performs deleting one of the client response

templates. Arrow **3664** directs execution from operation **3662** to operation **3648**. Operation **3648** terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a branching mechanism. Such a mechanism can be driven by client choices via
5 a user interface, such as buttons or pull down menus being selected or pushed.

Figure **91** depicts a flowchart of further details of operation **2704** of Figure **56** supporting use of a client response template to create a first-service-provider response in accordance with certain embodiments. Arrow **3670** directs the flow of execution from starting operation **2704** to operation **3672**. Operation **3672** performs invoking one of the client response templates in conjunction with the processed, received client service query message. Arrow **3674** directs execution from operation **3672** to operation **3676**. Operation **3676** performs responding by first service provider to invoked client response template and processed, received client service query message to create the first-service-provider response. Arrow **3678** directs execution from operation **3676** to operation **3680**. Operation **3680** terminates the operations of this flowchart.
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Figure **92** depicts a flowchart of operations embodied in a first message interface to support maintaining a collection of client problem templates in accordance with certain embodiments. Operation **3700** starts the operations of this flowchart. Arrow **3702** directs the flow of execution from operation **3700** to operation **3704**. Operation **3704** performs receiving the client problem template from service-flow engine. Arrow **3706** directs execution from operation **3704** to operation **3708**. Operation **3708** performs processing
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the received client problem template to create a processed, received client problem template. Arrow **3710** directs execution from operation **3708** to operation **3712**. Operation **3712** performs adding the processed, received client problem template to the collection of client problem templates. Arrow **3714** directs execution from operation **3712** to operation **3716**. Operation **3716** terminates the operations of this flowchart.

Figure **93** depicts a flowchart of further details of operation **2604** of Figure **53** supporting use of a client problem template to create an educated service query using a first service interface in accordance with certain embodiments.

Arrow **3730** directs the flow of execution from starting operation **2604** to operation **3732**. Operation **3732** performs invoking one of the client problem templates. Arrow **3734** directs execution from operation **3732** to operation **3736**. Operation **3736** performs responding by client to invoked client problem templates to create the educated query message. Arrow **3738** directs execution from operation **3736** to operation **3740**. Operation **3740** terminates the operations of this flowchart.

Figure **94** depicts a flowchart of operations embodied in a service profiler process performed by a service-flow engine to generate and send client problem templates to clients in accordance with certain embodiments.

Operation **3760** starts the operations of this flowchart. Arrow **3762** directs the flow of execution from operation **3760** to operation **3764**. Operation **3764** performs generating a client problem template from the client service profile. Arrow **3766** directs execution from operation **3764** to operation **3768**. Operation **3768** performs sending the client problem template to the client at the corresponding client address. Arrow **3770** directs execution from

operation **3768** to operation **3772**. Operation **3772** terminates the operations of this flowchart.

Figure **95** depicts a flow diagram of a service profiler process in accordance with certain embodiments. Box **3800** designates a Service Profiler Process

- 5 Dispatcher. This communicates via physical transport mechanism **3802** to network **3804**. Box **3808** designates Service profiler sub-process 1 on service-flow engine 1, performing the operation **2630** of Figure **54**. This communicates via physical transport mechanism **3806** to network **3804**. Box **3812** designates Service profiler sub-process 2 on service-flow engine 2, performing the operation **2740** of Figure **57**. This communicates via physical transport mechanism **3810** to network **3804**. Box **3816** designates Service profiler sub-process 3 on service-flow engine 3, performing the operation **3040** of Figure **69**. This communicates via physical transport mechanism **3814** to network **3804**. Box **3820** designates Service profiler sub-process 4 on service-flow engine 4, performing the operation **3270** of Figure **76**. This communicates via physical transport mechanism **3818** to network **3804**. Box **3824** designates Service profiler sub-process 5 on service-flow engine 5, performing the operation **3470** of Figure **84**. This communicates via physical transport mechanism **3822** to network **3804**. Box **3828** designates Service profiler sub-process 6 on service-flow engine 6, performing the operation **3490** of Figure **85**. This communicates via physical transport mechanism **3826** to network **3804**. Box **3832** designates Service profiler sub-process 7 on service-flow engine 7, performing the operation **3760** of Figure **94**. This communicates via physical transport mechanism **3830** to network **3804**.

Note that in certain alternative embodiments, collections of these sub-processes may preferably reside on a single service-flow engine. Note that in certain other embodiments, multiple service-flow engines may be performing a given sub-process.

- 5 Figure 96 depicts a flow diagram of a computer program capable of receiving a message from a service provider containing a service recommendation and responding to the message containing the service recommendation in accordance with an aspect of the invention. Operation 3850 starts the operations of this flowchart. Arrow 3852 directs the flow of execution from operation 3850 to operation 3854. Operation 3854 performs receiving the client message with an embedded service recommendation. Arrow 3856 directs execution from operation 3854 to operation 3858. Operation 3858 performs displaying the received client message with embedded service recommendation. Arrow 3860 directs execution from operation 3858 to operation 3862. Operation 3862 performs responding to the client message with embedded service recommendation. Arrow 3864 directs execution from operation 3862 to operation 3866. Operation 3866 terminates the operations of this flowchart.
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Figure 97 depicts a flowchart of further details of the code of 3854 of Figure 96 supporting receiving a client message with an embedded service recommendation in accordance with certain embodiments. Arrow 3880 directs the flow of execution from starting operation 3854 to operation 3882. Operation 3882 performs receiving an encrypted client message with embedded service recommendation. Arrow 3884 directs execution from operation 3882 to operation 3886. Operation 3886 performs processing the

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received, encrypted client message with embedded service recommendation to create the received client message with embedded service recommendation. Arrow **3888** directs execution from operation **3886** to operation **3890**. Operation **3890** terminates the operations of this flowchart.

- 5 Figure **98** depicts a flowchart of further details of the code of **3862** of Figure **96** supporting responding to the client response message in accordance with certain embodiments. Arrow **3900** directs the flow of execution from starting operation **3862** to operation **3902**. Operation **3902** performs generating a client service recommendation message from said embedded service recommendation. Arrow **3904** directs execution from operation **3902** to operation **3906**. Operation **3906** performs sending said client service recommendation message to said service-flow engine. Arrow **3908** directs execution from operation **3906** to operation **3910**. Operation **3910** terminates the operations of this flowchart.
- 10 Figure **98A** depicts a flowchart of further details of **3311** of Figure **78** supporting integrating a service order in accordance with certain embodiments.

Arrow **3920** directs the flow of execution from starting operation **3311** to operation **3922**. Operation **3922** determines if the received client response message contains an embedded service recommendation. Arrow **3924** directs execution from operation **3922** to operation **3926**. Arrow **3924** directs execution when the determination is ‘Yes’ to operation **3926**. Arrow **3954** directs execution when the determination is ‘No’ to operation **3946**.

Operation **3926** performs receiving the client service order message from the first client. Arrow **3928** directs execution from operation **3926** to operation **3930**. Operation **3930** determines if the client service order message from the first client is compatible with the embedded service recommendation
5 contained in the received client response message. Arrow **3932** directs execution from operation **3930** to operation **3934**. Arrow **3932** directs execution when the determination is ‘Yes’ to operation **3934**. Arrow **3956** directs execution when the determination is ‘No’ to operation **3946**.

Operation **3934** determines if the client service order received from the first
10 client authorizes the service order. Arrow **3936** directs execution from operation **3934** to operation **3938**. Arrow **3936** directs execution when the determination is ‘Yes’ to operation **3938**. Arrow **3958** directs execution when the determination is ‘No’ to operation **3946**.

Operation **3938** determines a first pharmacy from the client service order.
15 Arrow **3940** directs execution from operation **3938** to operation **3942**. Operation **3942** performs generates and sends the service order message to the first pharmacy based upon the received client response message and the received client service order message. Arrow **3944** directs execution from operation **3942** to operation **3946**. Operation **3946** terminates the operations
20 of this flowchart.

Figure **98B** depicts a flowchart of further details of **3324** of Figure **78A** supporting generating a pharmacy service order in accordance with certain embodiments.

Arrow **3960** directs the flow of execution from starting operation **1324** to operation **3962**. Operation **3962** determines if the processed, received client service order is compatible with the processed, received service provider service recommendation. Arrow **3964** directs execution when the 5 determination is ‘Yes’ to operation **3966**. Arrow **3978** directs usage when the determination is ‘No’ to operation **3970**.

Operation **3966** generates a pharmacy service order message from the processed, received service provider service recommendation message and the processed, received client service order. Arrow **3968** directs execution 10 from operation **3966** to operation **3970**. Operation **3970** terminates the operations of this flowchart.

Figure **98C** depicts a flowchart of further details of **3326** of Figure **78A** supporting sending a pharmacy service order to a pharmacy in accordance with certain embodiments.

15 Arrow **3980** directs the flow of execution from starting operation **3326** to operation **3962**. Operation **3962** determines if the processed, received client service order is compatible with the processed, received service provider service recommendation. Arrow **3984** directs execution from operation **3962** to operation **3986**. Arrow **3984** directs execution when the determination is 20 ‘Yes’ to operation **3986**. Arrow **3998** directs usage when the determination is ‘No’ to operation **3994**.

Operation **3986** performs determine the first pharmacy from the processed, received client service order. Arrow **3988** directs execution from operation **3986** to operation **3990**. Operation **3990** performs sending the pharmacy

service order message to the first pharmacy. Arrow **3992** directs execution from operation **3990** to operation **3994**. Operation **3994** terminates the operations of this flowchart.

Figure **98D** depicts a flowchart of further details of **3106** of Figure **71**

5 supporting determining a routing chain of service extenders and embedding the routing chain into a second client query in accordance with certain embodiments.

Arrow **4010** directs the flow of execution from starting operation **1106** to operation **4012**. Operation **4012** determines a routing chain of service extenders. Arrow **4014** directs execution from operation **4012** to operation **4016**. Operation **4016** embeds the routing chain of service extenders into the second service query. Arrow **4018** directs execution from operation **4016** to operation **4020**. Operation **4020** terminates the operations of this flowchart.

10 Note that a routing chain of service extenders is a collection of at least one

15 service extender to whom the second client query will be routed after the first service extender has added their proposed response to the client query.

Figure **98E** depicts a flowchart of further details of **3178** of Figure **72**

supporting determining successor service extenders in an embedded service extender routing chain, generating a successor service query message with 20 embedded proposed client response and sending the successor client service query to the successor service extender.

Arrow **4030** directs the flow of execution from starting operation **1178** to operation **4032**. Operation **4032** determines if there is a successor service extender in the embedded service extender chain. Arrow **4034** directs

execution from operation **4032** to operation **4036**. Arrow **4034** directs execution when the determination is ‘Yes’ to operation **4032**. Arrow **4048** directs execution when the determination is ‘No’ to operation **4044**.

Operation **4036** generates the successor service query message with the embedded proposed client response. Arrow **4038** directs execution from operation **4036** to operation **4040**. Operation **4040** send the successor client service query to the successor service extender. Arrow **4042** directs execution from operation **4040** to operation **4044**. Operation **4044** terminates the operations of this flowchart.

Figure **98F** depicts a flowchart of further details of **2646** of Figure **54** supporting generating a routing tree of service providers with first service provider final destination and source list of service providers, generating and sending a source service query to each service provider included in the service provider source list.

Arrow **4060** directs the flow of execution from starting operation **646** to operation **4062**. Operation **4062** performs generating a routing tree of service providers with the first service provider the final destination of the routing tree and a source list of service providers of the routing tree. Arrow **4064** directs execution from operation **4062** to operation **4066**. Operation **4066** performs generating and sending a source service query for and to each service provider belonging to the source list of the routing tree. Arrow **4068** directs execution from operation **4066** to operation **4070**. Operation **4070** terminates the operations of this flowchart.

This disclosure is provided to reveal a embodiment of the invention and a best mode for practicing the invention. However, one skilled in the art will readily appreciate that other approaches may be substituted for those set forth herein without departing from the spirit and scope of the present invention. Further,
5 additional advantages, applications and modifications of the invention will readily occur to those skilled in the art. Accordingly, the invention should only be limited by the claims included below.